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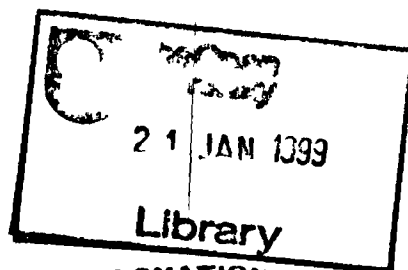
**Economic institutions and routine practices: the case
of high-technology small and medium-sized
enterprises.**

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Thesis submitted for the degree of Doctor of Philosophy in Economics

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Abstract

The dissertation provides a rich analysis of routines in four case-study companies. Explanations for the behaviour of the firms are developed and provide new building blocks for the understanding of other firms in different circumstances, emphasising empirical evidence, rule-based action and recognising the historical, social and interpretive contexts.

Routines are defined as established, significant, sanctioned and recurrent practices within organizations. A number of key features of organizations figure in the analysis: the relationship between structure and agency, the firm's culture and the firm's history. Structures are identified as rules and relationships. The analysis of agency focuses on the position of the agent, the agent's skill and the desire to reduce uncertainty.

Technology is an important factor in the analysis. It is (partly) *constitutive* of the firms, that is it has the power to enact or establish the firms. It cannot do this on its own, it is argued, but, in interacting with other factors, has major implications for the structure and routine behaviour of the firms. The cases suggest that technology has implications for human agency which go beyond the initial intentions of the agents. Technology is not determining but interacts with the other factors in a recursive way and cannot be adequately analysed outside the social system of which it is a part.

The primary contribution of the research is the development of a broader concept of routine, in particular, the identification of routine practices at a strategic level and the demonstration that such practices can incorporate change.

In addition, the analysis identifies the role of technology in economic change. It adds to the understanding of routines more generally and confirms that an institutional approach to the understanding of firms' behaviour is fruitful and can add to the current repertoire of approaches in Economics.

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Chapter 1: Introduction

1.1 Objectives

“Habits gradually change the face of one’s life as time changes one’s physical face; and one does not know it”. This quotation from Virginia Woolf’s diaries (*Diaries*, Vol III, p 74, 11th April 1926) eloquently expresses much of the reasoning behind the project set out here. The lives in this case are those of four small and medium sized high-technology firms. Their physical faces and organizational practices changed during the period in which they were studied. The motivation for the research was to try to understand better the changes which took place and in particular the ways in which routine behaviour was implicated in promoting or inhibiting particular changes.

Routines, as the term is used here, are the taken-for-granted ways of working which are usually unchallenged. They are “the way we do things around here” and as subsequent chapters go on to show, they have considerable influence on organizational change. Routines are the recurrent practices and regularities in company behaviour. They are not fixed but changes in them are slower than changes elsewhere in the organization. Lawson (1997) in an ugly phrase, but one which reflects the usage here, would call them demi-regularities.

An interest in routines derives from three broad objectives which originally motivated the project. Firstly, the project is attempting to contribute to a richer social ontology through which to understand firms’ behaviour. The static analysis of conventional neo-classical economics is unable to deal with *processes* of change and organizational behaviour. But in alternative approaches to analysing firms, such as those adopted by the institutional schools, routine behaviour is often taken for granted as a low level activity whilst being frequently seen as inappropriate at policy-making or strategic levels. In the management literature, conversely, routine behaviour is frequently undifferentiated from organizational culture so that the term “culture” becomes a catch-all for everything the firm does. This project enriches the conceptual framework available by distinguishing between routines and cultures and by investigating, empirically and theoretically, the nature of routines themselves. The distinctions here will be set out in the next section and developed in subsequent chapters.

The second objective was to consider change in organizations and the relationship between change and routines. A prime motivation came originally from the literature on organizational learning. There are a number of different approaches to organizational learning, which are reviewed in the next chapter, and the term has been adopted both as a consultancy tool based around the training needs of individuals and companies, and as an organizational or sociological concept, which identifies the structures in companies which best promote knowledge management frequently using a systems framework. It has value for understanding small and medium-sized firms (Reid and Garnsey 1998). An important consideration is to study the structures and individual practices in firms which promote or inhibit learning, which in other words enable the company to identify and engage with change. Routines form part of the practices and are implicated in changes in the structures. As will be shown, routines do not necessarily inhibit change, but can drive people to change and change can be incorporated as part of the routine.

The third objective relates to the implications of technology for organizational change. Recently electronic technologies have become commonplace and are seen in some interpretations to be the driving force behind change in firms, if not in the whole economy. The determinist view of technology is that it drives change: because of the technology, change will take place. For example, a recent American study of changes in higher education states that "Technology drives us toward disaggregation..." and furthermore, "The development of ever more effective electronic modes of delivering education ... will continue to erode the geographic hegemony of higher education..." (Heterick et al., 1997, pp 4-5). The study recognises that there are a range of factors operating in education but implicit throughout the report is an assumption that change is dependent upon technological breakthroughs and that its direction, if not its precise form, is inevitable. This project seeks to challenge such claims and to investigate directly the ways in which electronic technology is implicated in organizational change.

Additionally, technology has important practical implications for the project. In order to study routine behaviour it is necessary to choose a terrain in which change is taking place. Clearly an analysis of routines and change in a calm, unruffled area of the economy, if such an area exists, would produce quite different opportunities from the study of an area undergoing turbulent change. Unruffled calm does not allow us to differentiate between those things which are unchanging because the world is constant and those things which are unchanging because they are relatively enduring regularities. The firms studied were chosen, therefore, because in different ways they were engaged with advanced technologies. The hypothesis was that firms

working in high-technology areas would be likely to face elements of rapid change in at least some aspects of their work and that this would facilitate the study of organizational routines. Technology was thus a vehicle through which to assure change as well as an object of study in its own right.

1.2 Routines, structure, agency and culture.

Routine as a concept has been used for many years in the Economics and Economics-related literature but Nelson and Winter's classic text (Nelson and Winter 1982) developed the idea in a more systematic and theorised way than had been attempted hitherto. It distinguished three classes of routine: a short run routine reflecting the operating characteristics of the firm, routines which determine decisions about the firm's capital stock and routines which modify operating characteristics. Routine-guided processes were modelled as "searches". Nelson and Winter's work was one of the inspirations for this project. Their concepts are discussed more fully in the next chapter but as can be seen from the brief descriptions above, they are conceptual categories, developed primarily as modelling tools. They were grounded in empirical work but were not developed as empirical categories.

This project examines the behaviour of four small and medium-sized companies to identify empirical referents, if such exist, for Nelson and Winter's categories. Two broad levels of routine are identified, though they cannot be completely separated, operational routines and strategic routines. Operational routines are concerned with the continuing reproduction of the firm. They enable it to continue doing the things it does. Strategic routines are concerned with the place of the firm in its wider environment. Within these broad categories sub-routines or micro-routines can be identified. These are the more limited sets of practices which build up into the broad categories.

Subsequent chapters identify the mechanisms through which these routines are sustained and reproduced. To undertake this requires an examination of the relationship between structures, both within the organization and from the wider economy, and agents. Structures are defined here as the formal and informal rules which govern behaviour and the relationships which depend upon them. They may be written down as procedures or understood on the basis of widely accepted norms based in more general rules. They are reflected in the reporting hierarchies of the companies studied and partly define the position and status of staff and others connected with the company.

Agency is seen as human agency. However, in carrying out the research it became clear that agency could not be separated entirely from the materiality of the world. The extent to which technology can be conceived as an agent in its own right is addressed in the empirical work and in the review of the literature. The project examines the extent to which technology is constitutive of the firm. In some cases information technology is deeply constitutive, for example one of the companies studied developed teleworking as a primary organizational form which would have been practically impossible without sophisticated information systems.

Culture is used as a category which reflects and acknowledges the “cultural turn” in the human and social sciences (Hall 1997). This approach emphasises the importance of meaning for the definition of culture. Culture, in this interpretation, is not a set of things, such as paintings or novels, but is to do with the production and exchange of meanings. If a group of people belong to the same culture then they share a set of meanings about the world: they interpret the world in the same way. That sharing is not complete. Within the same culture there will be subtly different interpretations and different ways of representing meanings and those differences are implicated in the changes in culture and the different practices which represent it. The question of meaning arises in all aspects of the social world. Artefacts have symbolic meaning, for example in one of the case-study companies, the company’s building represents much more than simply a place of work, and meanings are communicated through gesture and dress, for example, as well as importantly through language. Hall describes language as “one of the privileged ‘media’ through which meaning is produced and circulated” (Hall 1997, p 4).

1.3 An interpretive and recursive approach

Routines are practices which are situated in a particular set of meanings. This project uncovers those practices by interpreting the actions of human agents in different structural positions in the four companies studied. The interpretations draw heavily on the participants’ own interpretations of what they were doing and why. The primary research evidence is the language of the participants and the meanings they place upon the events, symbols and relationships they describe.

An interpretive approach is therefore central to the project. Underlying that approach is a recursive explanatory framework. Routines and technology appear as both explanation and explanandum. The explanation involves self-reflection on

behalf of the agents observed. They are not seen as automatons. Self reflection is part of the recursive framework: human agency involves reflection on what has gone before so that behaviour and structures are modified, frequently in a non-deliberate way, in the light of experience. Giddens calls this the double hermeneutic (Jones 1998a). The explanatory framework is therefore also path dependent. The place from which an individual or company starts is partly affected by where it has come from, and in turn restricts the directions in which it can go.

1.4 The contribution of the dissertation

The dissertation contributes to the Economics and Management literature by providing a richer analysis of the nature of routines in small and medium-sized firms. The categories which are discussed and developed here provide explanations for the behaviour of the four firms studied and provide new building blocks for the understanding of other firms in different circumstances. Specifically, routines are used as an explanatory concept at strategic levels in organizations and to explain the ways in which firms engage with and incorporate change into their practices. This has not been done before. Subsequent chapters argue that the use of the concept in this way adds significantly to our understanding of the behaviour of the firms studied.

At an empirical level the dissertation asks a number of questions about routines:

Can routines be identified?

Can change in routines be explained?

Is it possible to come up with a recursive explanation for routines?

The research evidence here answers each of those questions in the affirmative and develops an understanding of what high-technology firms are and how they behave. The dissertation is empirically grounded. It uses a fieldwork methodology which is widespread in management research but relatively unfashionable in Economics. The research results justify a wider use of such methods in Economics since they provide a deeper and richer understanding of the behaviour of economic institutions.

Finally, the dissertation explores the relationship between economic and technological categories. It contributes an understanding of the extent to which technology is constitutive of firms, that is the extent to which it has the power to enact or establish firms. In the research reported here, electronic technologies possess some of the characteristics of change agents through sharing information,

providing the potential for new forms of control (Zuboff (1988) would describe these features as informing) and, through these characteristics, changing the perceptions individuals have about themselves and their roles. Technological products also contribute to the interpretations firms make of their external environments. Technology can be seen to both enable and constrain organizational behaviour but it cannot be adequately analysed outside the social system of which, this project argues, it is a part.

1.5 The research process

The research methods used are set out in detail in chapter 3. The research questions produced a logic in the choice of fieldwork. Analysing change meant that the study should be longitudinal. A number of firms needed to be investigated which had clear differences so that routine practices had potential contrasts. The firms should also be concerned with new electronic technologies, but in different ways so that the implications of technology for change could be better understood.

Four organizations were eventually selected with characteristics which met these criteria. All are in the same local economy, greater Cambridge, in order to minimise distinctions arising from spatial differences. They are all small to medium-sized. At the beginning of the research all employed over 50 but less than 100 people. All were involved in working with the new technologies in some way.

Two of the organizations chosen were in the new-technology business. One was the east of England branch of a major well-established computer manufacturer. It manufactured, serviced and provided consultancy services in computing and so was directly involved in the development of ideas about technology as well as producing the artefacts themselves. It had recently re-organised its consultancy wing in the East of England as a flexible-working, home-based unit linked by networks of sophisticated technologies. This was the area of the company which was studied. The second technology-based firm was a supplier of advanced software and internet services. It was at the forefront of what was then conceived by many commentators to be the most dynamic and uncertain part of the economy. It was entirely focused around changes in the new technologies.

Studying only organizations like these, however, would focus the research too much upon the experiences of a particular sector. It was important to look also at organizations which use technology, perhaps in a very sophisticated way, but whose

business is not entirely concentrated in the technology in order to see if contrasts exist in their experience and whether routines, change and technology interact in similar ways for firms outside the sector as for those inside. Two further organizations were approached, therefore, in order to broaden the perspective. The first of these is a publisher which publishes through new technologies. It began as a publisher using microforms - microfiche and microfilm - moved on to publishing on CD-ROMS and, during the period of the research, moved into publishing on-line via the internet. Whilst it is a technologically sophisticated company its focus of attention and its strong sense of its own image is as a publisher not as a high-tech firm.

The last organization participating in the research is less technologically sophisticated. At the design stage in the research it seemed desirable to study an organization which was undergoing major technical change but which had not used technologies in a significant way before. The fourth company is a small, successful trust producing distance-learning materials (and therefore with some similarities to the publisher) which had used some computing facilities but which was in the process of implementing a major information systems re-development. It was therefore possible to study the ways in which the new technologies were perceived and how they fitted into previously acquired routines as the changes associated with the implementation of the new technologies were happening.

Field work was carried out in all four organizations over a two and a half year period. It became clear early on that routine behaviour existed in each institution. The research then focused on the features of the organizations upon which routine behaviour was based. Where did routines arise, how were they reproduced and transformed, and what part did the new technologies play in this? The field work was interpretive. It asked questions of participants in the organizations and tried to gain access to their explicit and implicit frameworks and understandings. It also used observation and published material to gain a broad picture.

Underlying the research are particular ontological and epistemological positions. These developed as the research proceeded. The research process explicitly adopted an approach compatible with the hermeneutic circle, tacking backwards and forwards between observations and interpretations.

1.6 The structure of the dissertation

Chapter 2 reviews the different literatures from which the research ideas are drawn and sets out the theoretical position of the project. Chapter 3 describes and comments upon the research methods which were adopted.

There then follow four chapters, one based in each of the companies studied. These chapters set out the background to the particular companies but are used to develop the argument of the dissertation. They progress the interpretation of routines and technology in the context of the different companies. They do not present a comprehensive case study of each company. Each chapter picks up the developing argument from the previous one.

Chapter 4 is based in one of the technological focused companies and uses the experiences there to examine operational routines and to investigate whether they can be created or whether they evolve. Chapter 5 focuses on the company which was implementing a new information system. It moves on from the analysis of operational routines in chapter 4 and investigates routines at a strategic level. Operational and strategic routines cannot be entirely separated but the chapter shows that routine behaviour is important for strategy.

Chapter 6 builds on the concept of strategic routine to analyse the extent to which routine behaviour can incorporate change, or whether change is held back by routines. The company used in this chapter is the internet service provider. In many respects it is the most extreme company studied, as will become clear in chapter 6. If the concept of routine has value in this company, it will have value elsewhere. The company was very young and there is some further reflection in this chapter on the creation of new routines. Chapter 7 engages with the ideas set out in the previous chapter and examines their relevance in the fourth company, the publisher. It also reflects back on ideas that have appeared in the discussions of the other companies.

Each chapter analyses the way in which technology was implicated in the changes discussed.

Finally chapter 8 sets out the conclusions which can be drawn from the project and assesses the extent to which the objectives set out here have been, or can be achieved.

Chapter 2: Literature review and the theoretical framework of the project.

“The more we can learn about the way in which firms actually behave, the more we will be able to understand the laws of evolutionary development governing larger systems that involve many interacting firms in particular selection environments.” (Nelson and Winter 1982, p 410)

“In order to learn we must impose patterns on phenomena; that is the only way in which we can make sense of them. We may, of course, be making sense of what is not really sensible, especially when the subject of our study is human behaviour. So the assumption that human behaviour is based on reason, although a much weaker version of the standard economic assumption, can reasonably be criticised for assuming too much rationality.” (Loasby 1991, p viii)

Undoubtedly part of the problem reflects the still primitive state of our ability to work with cultural evolutionary theories. In this particular case I am sure it also stems from an overly broad and vague concept of the variable in question - institutions - which is defined so as to cover an extraordinarily diverse set of things. Before we make more headway in understanding how “institutions” evolve we may have to unpack and drastically disaggregate the concept.” (Nelson 1995, p 84)

“Where should the analysis go next? First, for instance, it is necessary to examine the particular origins of those habits and rules. Second, the ways in which new rules and habits are created and displace others have to be addressed. Third, the criteria of efficacy have to be considered, including cases where habits or rules are more useful in some contexts rather than others, or may be advantageous for groups but not for individuals, or vice versa. Fourth, the mechanisms by which habits and rules build up to social routines and institutions have to be analysed, as well as the feedback loop by which institutions help in turn to reinforce particular habits and rules.” (Hodgson 1997, p 681)

2.1 Introduction

The four quotations above, drawn from the work of economists who are critical of mainstream ideas, show how our knowledge of the detailed working practices of firms has increased little since Nelson and Winter’s classic text in 1982. In 1982 Nelson and Winter argued that we need to learn more about the way firms actually

behave. This would be the beginning of a new approach to theorising and a search for “laws of evolutionary development”. Loasby questioned reason and rationality in 1991 and argued for imposing patterns on phenomena that recognised earlier moves away from models of rational maximisation. His approach implied the need to look for different decision methods in firms which took account of “making sense of what is not really sensible”. This would include patterns, which are described here as routines, for which, as Loasby sets out the case, no body of knowledge existed in 1991. In 1995, 13 years after his request (with Sidney Winter), Nelson continued to bemoan the vague generalisations in use and argued for the unpacking and disaggregating of concepts. Hodgson’s 1997 article sets out a research agenda: to examine the origins of habits and rules, to look at the creation and displacement of habits, to consider the efficacy of rules or habits and to consider the mechanisms by which habits and rules build up to social routines and institutions.

It is clear from such comments, and blueprints for further work, that knowledge of detailed working practices in firms is still limited in Economics. Concepts such as routines, rules and habits are being used increasingly and “institutional” is now a descriptor for a major research programme in Economics. It is time to examine such concepts in practice and in detail. The empirical and theoretical basis for the use of such concepts needs to be examined. Here I am concerned with habits and rules (to use Hodgson’s terms) and their implications, along with technology, for the creation and reproduction of routines.

There are a number of literatures available. Economics has been slow in considering detailed working practices of firms but the insights of economic theorising have not been used widely and there is much that Economics can learn and contribute. Organizational change forms part of the content of several disciplinary and interdisciplinary areas and the idea of a routine appears in different ways in many of them. To place the project adequately in the literature requires a consideration of the debates about organizational culture and learning. Discussions of organizational change processes are at the heart of the project. The research takes its orientation from institutional and evolutionary economic theory and in focusing on changes in electronic systems also draws from and contributes to interpretive information systems approaches to the interaction of human and technological systems.

This chapter is organised around topics rather than the different literatures. It begins by considering interpretive approaches to analysing the behaviour of firms and then looks broadly at organizational change processes. The focus then narrows

to a consideration of routines and moves on to address the inter-relationship between structures and agents and how it is necessary to deal with this dualism to provide an adequate explanatory framework for routine behaviour. Finally, the chapter reviews approaches to understanding the role of technology in organizational change.

2.2 Interpretive approaches

The research starts from a recognition that developments in evolutionary economics link closely to ideas coming from organizational theory and sociological theory. The notion of a *routine* which is a major analytical tool within evolutionary economics can be approached from the perspective of organizational culture but, as set out in Chapter 1, routines are different from culture. Routine is used as an abstract, general, theoretical tool by evolutionary economists and has been valuable for modelling the behaviour of firms. Computer simulation of firms' behaviour has been developed from such models. Empirical work in evolutionary economics, however, has concentrated on the material world, the traditional focus of economics, and has considered almost exclusively technical change and innovation (for example, Leydesdorff and Van Den Besselaar, 1994; Lundvall, 1992; Andersen, 1994). This was also the original motivation for Nelson (Nelson and Winter 1982, p vii).

In contrast, the research here focuses on the human and social side of the organization and studies the different perceptions of individuals in different structural positions within the 4 case-study companies. In looking through their eyes the objective is to find the key events, beliefs and symbols which they use in making sense of the organization and in particular the way in which economic decisions are formed. There is a need to look at events and processes as the subjects perceive them (Boland, 1985; Johnson, 1987; Walsham, 1993). The organization is the output of the processes under study and is not some kind of entity which can have opinions of its own or carry out its own actions. In order to understand the organization therefore it is crucial to gain an understanding of the perspectives of the members of the organization. Their combined understandings are essentially the organization's understandings. Such a focus is an interpretative one.

An interpretive approach emphasises the impossibility of finding objective knowledge. We cannot strip away all prejudice, or pre-existing theory; we interpret the world through experience. Understanding the behaviour of firms then requires a reading of the interpretations of those involved in the firm, but a recognition that the reading we are undertaking is also being interpreted through our own particular set

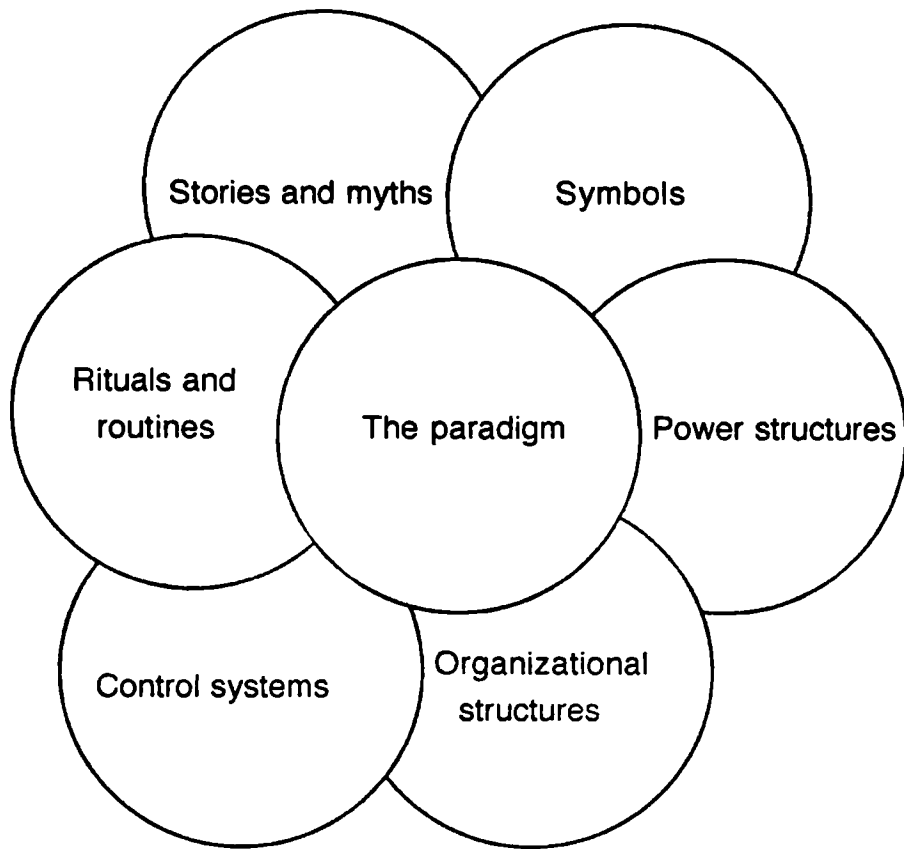
of theoretical lenses. *Reading* is a useful metaphor in this context. It is frequently, literally the activity undertaken: reading interview notes or the accounts given by other people, and it emphasises the active participation of the reader in the interpretation of the events under consideration. Boland (1985) emphasises the value of this approach in studying information systems.

An interpretive, cultural and political approach to organizational change is fruitful because it relates to the meanings perceived by actors within any organization about how the organization works and to the importance of the culture of the organization and the symbols which are used as part of that culture (Johnson 1987, 1988). This study describes and analyses elements of the cultures of each of the case-study firms in subsequent chapters to obtain a picture of the ways in which routine practices are understood.

Culture is not an exogenous feature of the organization's world. It is reproduced and transformed by the social and structural relationships inside and outside the organization. Culture as used here refers to the production and circulation of meaning (du Gay et al 1997). Culture is about shared meanings in which representation through language is a central process in the way meanings are produced (Hall 1997). Language forms the primary data here and quotations will be used throughout.

Cultures in organizations are frequently complex. Johnson, for example, argues that organizations have a complex *cultural web* centred on a paradigm. Surrounding the paradigm are the features of organizational life, the web, which overlap and inter-relate so that "organizational environments take on meaning, not independent of the organizational context, but within it; specifically that organizations are likely to have more or less homogeneous ideologies, the constraints of which provide meaning and legitimise organizational action....there are likely to exist a core set of such beliefs that are taken for granted, endure over time and account for the way the business competes....these beliefs....are embedded in the cultural and political web of organizational life. They are not remote from the day-to-day lives of managers but part of them." (Johnson 1987 p 230). The cultural web is thus effectively an organizational ideology. Figure 2.1 sets out Johnson's web. One element of the web is "rituals and routines". These are the only *practices* in his web. If we focus on practices, accepting Johnson's arguments, it is necessary to take into account the other elements of the web in interpreting the factors implicated in the creation and reproduction of routines.

Figure 2.1 The cultural web.



From Johnson (1987) Figure 7.2, p. 224.

Johnson's central paradigm comes from a range of sources internal and external to the firm. Culture does not exist only at the organizational level. "Recipes" also exist at the industry level (Grinyer and Spender 1979, Spender 1989). Culture is connected to industry-wide recipes as well as the local culture of the organization. Spender shows that similar firms in different industries can adopt different cultural meanings which are similar to those adopted by other firms in their industry. He defines recipes as "the industry's pattern of managerial belief" (Grinyer and Spender 1979, p 116). These ideas have a largely descriptive, static quality. For Johnson, the internal features of the firm are the primary focus, whilst Spender emphasises industry-wide norms. In order to understand company practices, or routines, we need to consider both.

The external world is interpreted by individuals inside the organization and is not separate from the internal world though it is frequently considered within organizations as a feature entirely external. This sense of internal and external context is seen as a crucial feature by a number of writers. For Pettigrew (1985) the key to understanding organizations is to insist that the historical, processual and contextual circumstances are all considered. Morgan (1989, 1986) following Weick (1979) supports the argument that the distinction between the organization and the outside world is not so sharp as is usually inferred. For interpretative organization theorists the environment is "an *enacted* or socially constructed domain that is as much the consequence of the language, ideas, and concepts through which people attempt to make sense of the wider world as it is of the 'reality' to which these social constructions relate." (Morgan 1989, p. 91). These ideas recognise that organizations are themselves players in their own environments and that they have some control over these environments. Furthermore the environments are themselves interpreted through constructions which are derived to a considerable extent within the organization. This approach is important in understanding the companies analysed in this project. It draws attention to the constructions made by companies and the way these are implicated in company practices.

Shared meanings and beliefs need to be constructed and maintained (Pfeffer 1981). The role of ritual and ceremony can be important. Shared meanings are not embodied solely in the more formal aspects of organizational life. Mundane behaviours too are important transmitters of organizational norms and beliefs (Nadler and Tushman 1990). Shared meanings are not seen in this project as elaborate, uniform, monolithic structures but as stocks of knowledge which are held in common and drawn upon (Boland 1996). In interpreting the routine practices of

companies we are studying the ways in which different actors draw upon that stock of knowledge and how in doing so they make themselves accountable to themselves and to others.

In chapters 4 to 7 the culture of each of the participating companies is investigated. The routines adopted by the firms can only be understood adequately in the context of the meanings within which they are placed. Culture is an important part of the explanatory framework. Culture has been distinguished from routine in chapter 1 and this distinction will be taken further in section 2.4 of this chapter where the idea of routine is more fully developed. First, however, it is necessary to discuss change processes in order to set up the framework for understanding routines. Routines are relatively enduring features of firms and need, therefore, to be set in the context of change.

2.3 Change processes

This thesis is focused on change. It concentrates on the dynamic aspects of firms' behaviour not just as a comparative static series of pictures, but to try to discover the ways in which firms generate and deal with change. Time is not simply elapsed time but has a chronology and a history. Events are essentially historical and influence activities in a path dependent way. This focus has a long history and as Thomas (1991) shows was a problem with which Marshall struggled in writing his *Principles*. Path dependency also has very clear practical implications, frequently at a technical level, well demonstrated by the history of the QWERTY keyboard (David 1985).

Accepting path dependency and the possibility of an evolutionary approach requires that antecedent conditions must be considered in analysing decisions. History should not be considered an event in the past but as part of current conditions and understandings. Context is about the interpretations and meanings which actors make when undertaking the process of decision-making (Pettigrew 1985). The strategic agenda has to be set in context. It is necessary to consider how items get onto the strategic agenda, and to look at agenda *building* rather than agenda *setting* (Dutton 1988). We should also distinguish between the objective conditions faced by a firm, the cognitive arena and the network of potential and actual collaborators (Child and Smith 1987). Different outcomes will arise depending upon the balance of these features. Child and Smith argue that the legacy of a firm's history bears heavily on its ability to effect transformation. The firm is encumbered by founding ideologies, sedimented structures and distinctive competences which may no longer

be suited to its competitive environment. Routines themselves become sedimented and we must consider the mechanisms or processes which enable (some) organizations to manage this.

Chandler (1962, 1977, 1988) took history seriously and insisted that a meaningful analysis of the firm required accurate knowledge of the firm's organization and administrative history because organizational structure was intimately related to the ways in which the enterprise had expanded. His work gives an excellent justification for a historically-specific case-study approach. He argued that, "The underlying argument.....is that the impact of changing technologies and markets on economies of scale and scope and on transactions costs - and on the organization created to exploit those economies - provides the most satisfactory answer to the basic historical questions of why the large multi-unit industrial enterprise came when it did, where it did, and in the way that it did." (Chandler, 1988 reprinted in McCraw, 1988, p. 476).

Chandler's analysis was influenced significantly by a Parsonian structural-functional approach, however. He believed that social science was value-neutral and he had little interest in intellectual history (McCraw, 1988). He imposed his own framework on his detailed and thorough case-studies and emphasised the importance of rational planning. He sits uncomfortably in an interpretive approach but he recognised the importance of detailed case studies, a serious consideration of history and historical processes.

Chandler's emphasis on rationality and the value-neutrality of the social sciences fails to recognise the social construction of institutions and processes and there is an increasing recognition that models of strategic change which emphasise rational planning are no longer adequate (Mintzberg 1990). Much of the discussion was pre-figured in Child's influential work (Child 1972). Mintzberg has continually argued there is no one best way of managing. Rather, he has developed a number of "configurations" of organizations. Originally each form was conceived as a separate organizational type. Mintzberg has argued that the forms are better understood as nodes between which organizations are pulled (Mintzberg and Quinn 1991). Any given organization might never reach a particular node but will find itself pulled between different structural forms through internal and external forces. Some forms are more adept at learning and surviving in changing environments than others, in particular the adhocracy. His attempt to provide an overarching theoretical framework is not entirely convincing. His choice of nodes is limited by the cases he

examined and the boundaries of the configurations are in some ways arbitrary. A combination of two configurations is perfectly plausible. However, his work is valuable in emphasising the emerging, socially-constructed nature of strategy formation, from which his work on forms is partly derived, and in setting up configurations which can act as models or metaphors through which to consider other organizations.

A number of writers, including Mintzberg, have noted that organizational change tends to continue in small steady steps punctuated by larger quantum jumps (Tushman and Romanelli 1985, Mintzberg and Waters 1982, Miller 1982, Miller and Friesen 1980). The claim has been disputed (Quinn 1980) but there has been some coming together of views (Mintzberg and Quinn 1991). Overlaying the claim was the earlier observation (Mintzberg, 1978) that the behaviour which senior managers undertook in organizations frequently did not resemble the models found in many management textbooks, in particular those which emphasised rational planning and decision-making such as Chandler. Managers' actual behaviour involved more responsive and immediate judgements and rested upon a sensitivity to the environment rather than the firm implementation of previously devised plans. Mintzberg argued that strategy emerged from patterns of actions rather than from rational planning. Patterns of actions in Mintzberg's sense have a strong similarity to the idea of routines presented in evolutionary economics. Mintzberg does not dwell upon the manner in which actions become routinised but his configurations are in many respects examples of particular combinations of routinised actions which suit particular environments.

The argument about incremental or quantum change in organizations is similar to the epistemological debate over paradigm shifts in science (Kuhn 1970). Major changes occur only when established theories are clearly full of anomalies, and even then some proponents of a paradigm will never renounce it, though they may have lost faith in it. The discipline in science or the organization in the context of this research is a social construction held together by norms, established structures and power relationships and history. Loasby (1991) takes this analogy seriously and has argued this point throughout much of his career.

2.4 Routines

The search for routines, how they are constituted and changed, is the central focus of this research. The idea of a routine is at least implicit in the organization theory and sociological theory which has been reviewed so far. The notion of sedimented

structures and routinised behaviour is common to the literature on organizational culture. Patterns of actions are seen as important in the literature on strategic change processes. These can be considered to be routines at a strategic level. The idea of organizational learning implies a set of relatively routine behaviours which promotes benign responses to stimuli, and an equivalent set of routines which inhibits learning.

In economics the term routine is used in a conceptually similar way but plays a more significant role in the development of theory than has been the case so far in the other social sciences. Douglas (1987) describes economists as the strong theoreticians in the social sciences typically concerned with ideas about the *material* world, using applied science and rigorous theory which is measurable.

Routines in economics have been placed in the material world and empirical work has concentrated on the more directly measurable features of routine behaviour and their outcomes, such as those connected with technical change. This study is attempting to look at features which bring human dimensions of routines to the forefront and the approach which is taken to routine behaviour in evolutionary economics can be of considerable help.

Evolutionary economics challenges the (comparative) static models which have driven the discipline in the past and focuses on processes of change using a biological analogy. Nelson and Winter (1982) conceive of routines as the genes of an organization. Routines are acquired by organizations in the same manner as skills are acquired by individuals. Organizations become skilful and consequently do not take decisions but simply undertake processes of action. The three different categories of routines distinguished by Nelson and Winter have been set out in Chapter 1: those relating to short run operating characteristics, routines determining the capital stock, i.e. investment and innovation, these are not always predictable, and routines modifying operating characteristics. The more successful organizations survive, rather like natural selection, through the interplay of their genes and their environments. The biological metaphor is powerful, partly because it has an applied focus and yet is sufficiently abstract to generate explanations across many organizations.

There is now a considerable literature arguing that economic analysis should move to an evolutionary approach as well as a number of classic articles and texts which are consistent with such a move (for example, Alchian, 1950; Matthews, 1984;

Boulding, 1981; Penrose, 1952). As yet there does not appear to be any empirical work which attempts to analyse the constitutive processes involved in the creation and reproduction of routines in firms and that is the area in which this project is attempting to make a contribution.

Ideas about routines or rule-bound behaviour are used increasingly in attempts to understand the behaviour of organizations. Routines are seen, at a common sense level, as pre-determined, unchanging patterns of behaviour exemplified by the kind of activities which workers carry out on production lines. Thus passing partially-completed sets of components from one worker to another, with each adding a small contribution to the finished product is the common image of routine. This image has been used metaphorically in the literature but it is not entirely appropriate. For example, Cohen and Bacadayan (1994) concentrate on the individual and psychological dimension of routine behaviour. Their definition, "patterned sequences of learned behavior involving multiple actors who are linked by relations of communication and/or authority" (Cohen and Bacadayan 1994 p 555) is appropriate only for a narrow range of behaviour untypical of many of the practices of organizations.

Hodgson (1993) emphasises that evolution does not necessarily produce beneficial outcomes. It is consistent with things getting worse as well as things getting better. Furthermore an evolutionary approach begins to resolve a number of problems which have bedevilled economic theorising. The preceding mechanical metaphor in economics excludes, or at best assumes, the importance of knowledge, the impact of qualitative change and the need to reflect upon path dependency - irreversibility through time (Hodgson 1995). There is no room in the mechanical model for systematic errors, no cumulative development and no room for real individual choice because of mechanistic assumptions. The biological analogy is also troubled, however. By concentrating on the features of individual genes, through a reductionist argument, it has moved discussion to a level where the inter-relation between systems elements is ignored. Natural selection, through genetic replication and random variation or mutation, leaves little role for intentionality, purposefulness or choice, or for the complexity of cultural factors (Jennings and Waller, 1995). The analogy with human systems cannot therefore be complete.

Nelson and Winter see routines as a response to the quantity and complexity of information faced by firms. Routines are not a conscious maximising choice, on these arguments, but are where the firm's organizational knowledge is stored. They

are a source of difference among firms which, through a selection mechanism, drives the evolutionary process.

Penrose (1959) pre-figured this form of analysis by distinguishing between resources and services (that resources render). It is the services which are a function of the experience and accumulated knowledge of the firm and that are the source of the firm's distinctiveness. Dynamic capabilities (Teece et al 1990) which are sticky, i.e. not easily changed, acquired or passed on, build on Penrose's distinction. Such capabilities are inherited from and constrained by the past and from them the firm develops a set of skills, assets and routines which become its core competencies. Such soft assets cannot be traded and so must be built, often over decades.

Teece's resource-based approach to the firm has many similarities to an approach which concentrates on routines. In the resource-based approach firms with superior organizational structures and capabilities are profitable because they have lower costs, higher quality or higher product performance. Their strengths are related to the experience inherent in management effectiveness and co-ordination. Intra-firm differences in performance are found to be greater than inter-industry differences (Teece, Pisano and Shuen 1990). This is another way of saying that the routine, or taken-for-granted practices in management, are an important source of difference between firms.

Nelson and Winter define routines as the "regular and predictable" aspects of firms' behaviour. In practice, rules and procedures cannot be too complicated because of the bounded rationality of people in firms, but modelling the firm requires modelling routines and observing how they change over time. Routines are at the heart of their analysis but the definition is very broad and all-encompassing.

Nelson and Winter's concerns are based upon a world possessing an excess of information (excessive, that is in relation to the ability of individuals or organizations to process it) which was the focus of the seminal work of March and Simon (1958). They define routinised behaviour: "Activity (individual or organizational) can usually be traced back to an environmental stimulus of some sort.....The responses to stimuli are of various kinds. At one extreme, a stimulus evokes a response - sometimes very elaborate - that has been developed and learned at some previous time as an appropriate response for a stimulus of this

class. This is the 'routinized' end of the continuum, where a stimulus calls forth a performance program almost instantaneously." (March and Simon 1958, p 139).

March and Simon's definition is important in insisting that firm differences matter and therefore that analysis of firms as unique and important institutions in themselves is an important activity. March and Simon discuss a continuum which describes behaviour moving from completely routinised to "problem-solving" where new performance programmes may be constructed. A set of activities are regarded as routinised "to the degree that choice has been simplified by the development of a fixed response to defined stimuli" (March and Simon 1958, p142). The research reported here will show that this is too stark a distinction in practice.

The variation and openness of routines is often missed. Grant (1991), for example, follows Nelson and Winter (1982) and defines routines as "regular and predictable patterns of activity which are made up of a sequence of co-ordinated actions by individuals". This misses the subtlety of Nelson's later analysis (Nelson 1995) and fails to recognise that routines can be *unpredictable* in the sense of determining any specific response, whilst nevertheless retaining a recognisable pattern or approach. It emphasises *predictability* over *repetition*. A routine need not be a clear sequence of co-ordinated actions. Indeed it would not normally be that. Skills and the routines based partly upon them are likely to be complex.

Grant goes on to argue that there is no pre-determined functional relationship between resources and capabilities. He argues, style, values, tradition and leadership are all critical to capabilities. Given these claims, routines could not, in their manifestations in the world, be regular and predictable patterns of activity. However, since routines do produce automatic responses and are based on skills, which are themselves a form of tacit knowledge (Nelson and Winter 1982), it is important, he claims, to recognise that their efficiency in dealing with day-to-day affairs can be constraining when faced with novel situations. Experience is a valuable skill though, for Grant, it becomes less important when change is rapid. But the experience of coping with change can itself become a skill and build routine forms of behaviour. The analysis of Unipalm-Pipex and Chadwyck-Healey in Chapters 7 and 8 shows how change can be incorporated into routine behaviour so that, in contradiction to Grant's claims, routines can be helpful in novel situations.

One of the few genuinely empirical approaches to routines (Pentland and Rueter 1994) addresses some of these issues but like the work of Cohen and Bacadayan

(1994), who are the other significant contributors to empirical work in this field, then concentrates on relatively low-level activities. Pentland and Rueter point to the critical position routines occupy in the analysis of organizations and argue that they are “complex patterns of social action”. Confusion arises, they claim, because routines are thought of as a “capacity” rather than a pattern of action (Pentland and Rueter 1994, p 484). In studying routines Pentland and Rueter emphasise the sequential structure of the patterns and build on earlier work by Pentland in adopting, what they call, a grammatical model.

Whilst the sequential structure of routines is not focused upon here, the grammatical model has interesting parallels with the work in this thesis. The grammatical model emphasises the nature of routines as patterns of action and, in doing so, shows how the grammar (using a metaphor of grammar and language) can produce different manifestations of the same basic structure. The grammar does not specify an outcome but defines the possibilities from which organizational members can accomplish particular sequences of action. Both structure and agency are therefore acknowledged by this model, as they are in this research (discussed in more detail in section 2.5).

Because routines are complex patterns of action, Pentland and Rueter argue that they cannot be seen as the automatic responses implied by those who adopt definitions like those of March and Simon. Rather they should be understood as effortful accomplishments. Their work is based in concepts developed by Giddens who emphasises that routine work is not mindless or automatic:

“The regular or routine features of encounters, in time as well as in space, represent institutionalized features of social systems. Routine is founded in tradition, custom or habit, but it is a major error to suppose that these phenomena need no explanation, that they are simply repetitive forms of behaviour carried out ‘mindlessly’. On the contrary, as Goffman (together with ethnomethodology) has helped to demonstrate, the routinized character of most social activity is something that has to be ‘worked at’ continually by those who sustain it in their day-to-day conduct.” (Giddens 1984, p 86, quoted in Pentland and Rueter 1994, p 488.)

Routines then are organizational practices and there is value in decomposing economic systems and in trying to discover insights about their component parts. A biological metaphor can be helpful (Loasby 1991), though it is important to avoid the determinism of natural selection. The decomposition cannot be complete but should

be based, Loasby argues, on concepts such as mental maps, evolution and routines (which, as has been noted, he relates to Kuhnian paradigms and Lakatosian research programmes). Rational choice approaches using falsifiability cannot work easily because of the “Duhem-Quine” problem - that we know something is wrong, i.e. we can falsify it, but we do not know with certainty what is wrong. Consequently Loasby is drawn to the conclusion that work to understand firms should be of the kind that I have described in this chapter as an interpretive approach.

This is further justification for adopting an interpretive approach. However, a broad interpretation of the primary concept - routine - is necessary since the idea of a routine is used in the analysis of patterns of behaviour which require some thought even though the behaviour may be in some senses automatic. A stimulus may prompt the firm towards a particular form of analysis or other form of complex behaviour. The behaviour is routine in the sense that those sorts of problems are always analysed in that way but it is not simple. Here the concept is used to refer to the *taken-for-grantedness* of behaviour and it has close links with the concepts of institutions and culture.

One of the fundamental premises of institutional economics is that the determination of whatever allocation occurs in society arises from the organizational structure - the institutions - which change through “non-deliberative” (habit and custom) and “deliberative” (legal) modes (Samuels 1995). Nelson defines institutions as “a complex of socially learned and shared values, norms, beliefs, meanings, symbols, customs, and standards that delineate the range of expected and accepted behaviour in a particular context” (Nelson 1995, p 80). This is consistent with the broader approach to institutions which comes out of anthropology. Douglas (1987), for example, sees an institution as a convention, which she defines, following Lewis (1968) as arising “when all parties have a common interest in there being a rule to ensure co-ordination, none has conflicting interest, and none will deviate lest the desired co-ordination is lost” (Douglas 1987, p 46). Such conventions are self policing and Douglas refers to an institution as a *legitimised* social grouping. The legitimacy can come from many places but specifically excludes any purely instrumental or practical arrangement that is recognised as such. Nelson’s “expected and accepted” behaviour is close to Douglas’ legitimacy. For the new (economic) institutionalists, institutions are the rules of the game (North 1990) where for North the emphasis is on the self reinforcing nature of institutionalised behaviour, a form of self policing convention. Path dependency is an important implication of these definitions.

For this thesis established practices at a societal level - institutions - are distinguished from those within the organization - routines. *Routines are seen as established, significant, sanctioned and recurrent practices within organizations.* The research searches for such practices in the four organizations studied. It asks to what extent the empirical practices which are uncovered map onto the categories set out by Nelson and Winter and this will be taken up in section 2.7 of this chapter. The research also seeks to explain the ways in which such practices are created and reproduced. Those explanations are set in a recursive framework linking structure, agency and technology. Section 2.5 discusses the relationship between structure and agency and section 2.6 introduces technology explicitly into the debate.

The empirical work distinguishes between strategic and operational routines as set out in Chapter 1. Strategic routines relate to the world outside the firm and to the future. Operational routines relate to the reproduction of the firm and enable it to continue doing the things that it does. Within each of these broad categories we can distinguish subsets of micro-routines from which the broader category is formed. For example, the way in which taken-for-granted relationships with a supplier are undertaken could form part of an operational routine - orders are given and received - or could have strategic implications in permitting or partly directing the firm into particular ways of coping with a new environment.

The research uncovers routinized practices. Not all behaviour is routinized but the argument is that a great deal of behaviour can be understood in this way and that to use a distinction such as that made by March and Simon (1958) between completely routinized and problem solving is not completely adequate. It is important to take into account the routine strategic practices which we can observe in firms and to account for the ways in which operational and strategic practices interact.

Routines, then, as the term is used here, are taken-for-granted recurrent practices. They are established, significant and sanctioned and occur at all levels in the firm. It is possible to break them down into component parts.

Before moving on to consider the recursive, evolutionary, explanatory framework which is adopted in the thesis, I would like to reflect briefly on the relationship between routines and learning. The learning organization literature was one of the motivating factors behind the research since it held out the prospect of identifying

organizational practices and cultural forms which could promote or inhibit particular ways of managing and increasing the knowledge of the organization.

Routines and learning

As discussed in section 2.2, meanings are constituted in culture. The practices based in routine behaviour are one way in which the organization exhibits its knowledge of its world. The metaphor that organizations know how to do things through their routines needs to be unpacked however (Winter 1988) into an account of the processes through which productive knowledge is preserved while individuals come and go. Search and selection become key and distinct factors for many authors (Nelson and Winter 1982, March and Simon 1958) in enabling and promoting change. Search is aimed at discovering alternatives of action or consequences of action. Firms have search strategies which are rule-based, and contingent on what is available to be found. For Nelson and Winter it is the fate of the routine, via search, which is important to theory, since that will determine the fate of the firm.

Developing appropriate routines - routines which are effective in achieving company objectives - or searching for new routines can be considered a form of organizational learning. Effective learning implies an incremental, *emerging* form of strategy rather than a quantum jump since learning is about reacting before the pain of crisis (De Geus 1988).

Quinn (1980) argued that managers are, in fact, *logically* incrementalist though he made a later distinction between the processes going on in senior managers' minds (incrementalism, i.e. learning and thinking) as they help to create new strategies, and the strategies actually pursued by the organization (Mintzberg and Quinn 1991). What this means is that the strategies pursued often seem to change in a quantum fashion but may well be conceived, or learned, incrementally.

In characterising learning organizations some authors imply that organizations possess their own organic capacities separate from those of their members. They imply, sometimes explicitly, that organizations have brains or memories or possess other cognitive skills. But it is individuals within organizations who learn, not the organizations themselves - there is a real risk of falling into the anthropomorphic fallacy. Can we have such a thing as "a collective mind"? Where is it located? How can organizations act except through individuals? Not only is there an

anthropomorphic fallacy but we also risk an inappropriate reification (to regard something abstract as a material thing) of the concept of organization.

Literature which addresses the issue of organizational learning directly focuses on contextual factors and on the *processes* of learning, frequently using human or animal learning as a model. Fiol and Lyles (1985) in a valuable, early survey look at both aspects. They do not attempt to bring the different contextual features together, however, and their account has, in that sense, been superseded by the approach of Johnson (1987, 1988) using a cultural web. Weick (1991) concentrates on cognitive issues and sets up a simple stimulus-response model. He shows that organizational learning does not map easily onto such traditional concerns and argues that we need a different definition of learning from that used in cognitive psychology. His alternative definition, "Learning is the process by which knowledge about action-outcome relationships and the effect of the environment on those relationships is developed" (Weick 1991, p 121, quoting Duncan and Weiss, 1979), is valuable since it brings us back directly to the importance of culture and the ways in which meanings are constructed both within the organization and through its recipe.

Weick's insights are not picked up elsewhere, however. Huber's survey (Huber 1991) claims to contribute to a more complete understanding of organizational learning but his paper frequently implies that organizations have an organic life of their own. Such slippage into the anthropomorphic fallacy is relatively frequent in the organizational learning literature because of an elision between cognitive understandings and social structures.

Huber (1991), for example, states, "an entity learns, if, through its processing of information, the range of its potential behaviours is changed" (Huber 1991, quoted in Jones 1994, p 3). This is not a helpful approach. Organizations are not concrete things and they do not, of themselves, possess cognitive abilities.

We should be wary of the metaphor that organizations possess cognition, however attractive it may be, and use the careful wording of Weick and Roberts (1993) (quoted in Jones 1994, p 4), "Mind is not the name of a person, place or thing but, rather, is a dispositional term that denotes a propensity to act in a certain manner or style". Furthermore collective mind is grounded in individual action - "when we say that a collective mind 'comprehends' unexpected events, we mean that heedful interrelating connects sufficient individual know-how to meet situational demands."

This implies that the appropriate model is not one of organizational cognition but is to do with social systems and processes.

The learning organization (or learning company perhaps more so because of the closeness implicit in “company”) is the organizational locus within which learning takes place. Pedler et al (1991) define “The Learning Company” as an organization which facilitates the learning of all its members and continuously transforms itself. It is thus possible to specify characteristics of a learning organization, such as these put forward by Jones and Hendry (1992), and to think of a learning organization as a structure, as a set of rules and relationships.

From a broadly Human Resource Development standpoint, conversely, organizational learning is specified as, “the way firms build, supplement and organise knowledge and routines around their activities and within their cultures, and adapt and develop organizational efficiency by improving the use of the broad skills of their workforces.” (Dodgson 1993, p 377). It is thus viewed as a process. However, in focusing on the individual something is missing.

For many people a learning organization is simply one which enables its employees/members to learn effectively. The concern is with the process of learning as much as with its outcomes. Indeed much of the commentary in this area implies that a successful learning process will necessarily produce good outcomes. It tends to ignore either the prospect that the learning may be good - but maybe about the wrong thing (however that is defined) or the possibility that there may be a contradiction/conflict of interest about who is learning what in whose interest. Learning, and learning’s contribution to change and evolutionary routines is by no means necessarily benign (Hodgson, 1993).

Many *organizational* features can impede learning in some circumstances. For example, Janis (1985) writing from a perspective in International Relations reflects on the way in which bad decisions get taken. He brings the social psychology of group behaviour to bear on the analysis of decision-making and shows that group norms can lead to major errors particularly when groups are operating under considerable stress. The concurrence seeking tendencies of groups, particularly cohesive groups, lead to *groupthink*, a kind of self-rationalisation, he argues.

Further reasons for evolutionary routines producing outcomes which are not benign can be drawn from the work of Argyris (1976). He argues that many modern organizations are designed and managed in such a way that they are (and will continue) deteriorating. This arises because of the skilled incompetence built into the way in which groups behave in organizations. Argyris argues that managers should adopt double-loop learning, that is they should reflect upon why things have happened rather than merely responding to the fact that they have happened. Thus, in terms of organizational learning, leaders must be open and candid about their mistakes and the mistakes of their subordinates. This should not be carried out in a threatening way, Argyris argues, but should be seen as part of the normal behaviour of the organization. Organizations then learn from their mistakes instead of covering them up. Argyris's arguments are persuasive though he leaves questions unanswered about the appropriateness of his suggestions for organizations in different social milieu and underestimates the complexity of organizational life and the importance of power structures. He sets out an ideal type and implies it is achievable by many organizations.

Argyris raises the role of leadership in promoting double-loop learning and in sensitising the organization to such approaches. He argues that such openness can only be effective if it is publicly and clearly a part of the theory-in-use of senior staff. But routine work, in the sense of a mundane focus on the here and now, can drive out non-routine work so that leaders are not able to reflect on their worlds and learn from them (Bennis and Nanus 1985). That is to say, that organizational routines do not allow leaders to look up from the immediate to consider the appropriateness of the way things are traditionally carried out. Hurst (1989) argues that organizations should reflect upon the range of skills and sensitivities needed for their work and build top *teams* which include different kinds of people. Team building of this kind is a routine which many firms find hard to accomplish as the companies investigated here exemplify. Leadership, however, is important. The term used here will be *strategic agent* since that reflects the fact that elements of leadership and strategic thinking are not solely embodied in the nominal leader. Strategic agency played a prominent role in all four of the companies studied here. The different opportunities in the different companies to look up from the here and now played a part in their changing behaviour and arose partly from taken-for-granted practices which created, or failed to create, space for such opportunities.

This can be analysed within a "cultural space" which is defined in terms of the codification and diffusion of knowledge (Boisot 1987). Culture and the complexity of the knowledge required then become important features to analyse in understanding

organizational change. Essentially Boisot is arguing that different organizational frameworks can be characterised by the level of codification in the knowledge they use, and by the extent to which that knowledge is diffused within the wider society. In the context of a learning organization it would follow that codification should be at a level which enabled learning to be widely diffused. Routines which codified knowledge effectively would be, by implication, better routines. Nelson and Winter (1982) however, argue that tacit knowledge is more typical of routine behaviour. Routines in their terms are skilful actions which are carried out without conscious thought. The question is how do the meanings of the culture become embodied in a set of practices which make them explicit. Some of this may come about through the use of information systems and sharing information. Zuboff (1988) has coined the term *informating* to deal with some of these issues and it will be picked up in section 2.6.

Senge (1990) puts the debate into the framework of systems thinking. For Senge systems thinking is the overarching framework which makes other features of the world explicable. He emphasises the need for structural explanations in understanding organizational learning. For learning to occur, Senge argues, it is crucial that managers begin to think in terms of systems archetypes. He seems to be arguing against a simplistic ideological position which sees the world solely in terms of individual actions in short time scales. His emphasis on the need to search for more systemic, longer-term explanations is important, though there is a relatively arbitrary quality to the analysis since he provides no overall rationale for the archetypes he presents (Garnsey 1992).

The debate about organizational learning therefore links to discussions of routines. The organizational learning literature is usually searching for solutions. Those contributions which avoid the anthropomorphic trap are, in effect, trying to find routines which produce better learning.

2.5 The inter-relationship of structure and agency.

An understanding of routine behaviour in firms thus requires an analytical framework which can bring together cultural, institutional and individual levels of analysis. In Economics the development of theory of this kind has been taken on by the institutional schools.

Institutional economists have taken a greater interest in methodology than more orthodox schools. This is unsurprising given the need for any heterodox group to be clear about the distinctiveness of its analysis. The “old institutionalists” building on the work of Commons and Veblen, in particular, have been largely an American phenomenon until the last decade or so, though the “Methodenstreit” of the German Historical Schools has also been influential (Becker 1998). They have largely rejected comparative static modelling based on closed systems and *ceteris paribus* assumptions and concentrate on the analysis of institutional power and the relationship between economic structures and human agency. The “new institutionalists” come from a more orthodox background and are less concerned with change processes and the relationships between agents and structure. The analysis in this project falls into the area of interest of old institutionalism but uses a theoretical framework which has not been well-developed there.

Institutionalism has been relatively eclectic so that incompatible modes of analysis can fall within its remit. It is a broad church. However it is generally understood to have a number of common features (Samuels 1995) and they form the framing assumptions of the analysis set out here. The emphasis is on social and economic evolution and argues that institutions are relatively enduring and socially constructed. Furthermore, the market economy is itself a system of social control which operates through institutions and is formed by institutions. Thus the idea of a self-subsistent individualism operating through a mechanical mode of theorising in the quest for static, determinate, optimum, equilibrium results is seen as an inadequate framework in which to understand the behaviour of economic institutions.

Technology is perceived as a major force in the transformation of economic systems but “it is human activity mediated through technology that determines what is a resource, its relative scarcity and efficiency” (Samuels 1995 p. 573).

For institutionalists, culture has a dual role both transcendentally in the formation of structures and identities, and as an artefact of the continuous interdependence among individuals and sub-groups. The relationship between structure and agency which is implicit in this institutional formulation lies at the core of the analysis.

Structuration

Structuration theory (Giddens 1982) emphasises the recursive relationship between agency and structure and is valuable in forcing an acknowledgement of the key

processes involved. Giddens describes structures as traces in the mind which exist only through the action of humans. His objective is to break out of the unsatisfactory *dualism*, as he sees it, of agency and structure, and instead to focus upon a *duality* of structure as the essential recursiveness of social life. Structure is both the medium and the outcome of the reproduction of social practices. In this perspective social science is irretrievably hermeneutic.

The concept of structuration is subtle. It arises from the long philosophical debate which sees agency or action by individuals to some extent in opposition to ideas of social structure or social system. It has parallels with debates about the extent to which individuals have free will as contrasted with individual behaviour being pre-determined or systematically constrained in some way. Giddens spends many pages discussing the relationship between the concepts of action and structure. He defines structure as “recursively organised rules and resources” (Giddens 1982 p 35) whilst structuration is seen as “conditions governing the continuity or transformation of structures, and therefore the reproduction of systems” (*ibid* p 35). What this comes down to is the need to conceptualise a structure which is constantly being maintained and changed by the actions of the individuals who operate within it. The individuals are not necessarily aware that their actions are both confirming the existence of the structure and changing it. In turn the structure, as a set of rules and resources, is independent of the individual and constrains and empowers the individual but it exists only in the instantiation of human action. The arguments link to the notion of *enactment* set out by Weick (1979) in the sense that the structural properties of social systems are, for Giddens, the outcome of the practices which constitute those systems. He is arguing that to understand organizations we must consider their structures and the processes in which individuals engage which legitimise and define those structures. Garnsey (1992) talks about these as the constitutive processes which exist in dynamic social systems.

Within structuration theory social rules are distinguished in similar ways to those of the institutionalists. Giddens talks of rules of social life and formulated rules. The latter are codified interpretations of rules existing in games or bureaucracies rather than rules as such. This is more complex but broadly matches the deliberative and non-deliberative distinction of the institutionalists. For Giddens action is a “continuous flow of conduct” (Giddens 1979, p 55) which is reflexively monitored. Actors are not assumed to have conscious goals but follow rules. They are knowledgeable and know how to play according to the rule. Rules thus generate practices.

A routine, however, has additional components, for Giddens, from those already discussed. Routines are integral to the continuity of the personality of the agent and to the institutions of society. They give the agent ontological security. Ontological security is important for Giddens. It is the system of inner security which is protected by social devices such as tact or saving face and maintained in a “fundamental way by the very predictability of routine” (Giddens 1984, p 51). This gives additional and helpful insights and can be incorporated into accounts which do not rely on the full apparatus of structuration theory. Bounded rationality contributes to insecurity and it is partly the search for ontological security which pushes organizations into developing routine forms of behaviour.

Giddens is one of the most influential living sociologists but his work is controversial. He does not claim that structuration theory should, or indeed can, provide a framework for social research, explaining that it is “relatively autonomous in respect of research” (Giddens 1990) His claims are ambitious however:

“I have never thought of structuration theory as providing a concrete research programme in the social sciences.....It is an attempt to work out an overall ontology of social life, offering concepts that will grasp both the rich texture of human action and the diverse properties of social institutions. Some of these concepts should be useful sensitizing devices for research purposes, while others help provide an explication of the logic of research into human social activities and cultural products.” (Giddens 1990, pp 310-311).

Some commentators claim that he writes in an excessively obscure manner:

“.....the systematic avoidance of examples that might tell what the abstract concepts mean; diagrams whose elements are words and whose spatial organization has no discernible meaning; citations almost entirely to work of one's own that is at the same level of abstract emptiness.....” (Stinchcombe 1990, p 47).

Giddens sets out 3 principles as relevant to the overall orientation of research in the social sciences (Giddens 1990). This is methodological rather than theoretical guidance. He calls the principles or precepts *contextual sensitivity*, the *complexity of human intentionality* and the *subtlety of social constraint*. Contextual sensitivity refers to the significance of context in any description or explanation; this includes

time and space and the knowledgeability of actors. The complexity of human intentionality refers to notions of intended and unintended consequences, whilst the third precept, the subtlety of social constraint, deals with the mediation of social constraints through agents' reasons.

Context is of overriding significance, according to Giddens. It includes spatial and temporal dimensions and links causality to the knowledgeability of actors, that is to say that one feature of the context can only be understood to be causally linked to another feature to the extent that human agents know about the link.

Giddens argues that structuration theory acts as a sensitizing device. The complex nature of the structures and systems involved in a case, and the nature of the actors actions cannot be understood simply in terms of individual motivation or psychology, nor simply as part of some overbearing sociological frame. The relationship between action and structure is a very subtle and complex one. These injunctions are well taken in this project. As a sensitizing device structuration theory is valuable. But there is a problem that in insisting that causality exists only within the structure-agency relationship and that structures are the instantiations of human actions, Giddens seems to deny the possibility of structures having a separate existence. He appears to be arguing that when structures are not being drawn upon, there is no evidence for them and therefore they do not exist. They only have effect when instantiated in human action. Giddens' structures are reducible to human action. They are "traces in the mind". In insisting that social theory avoids the determinism of functional arguments, Giddens constrains himself to a fundamentally hermeneutic position. But as Layder (1987) argues this does not allow for an objectivist account of social reality. Such an account must operate with a notion of structure as, at least partly, pre-constituted and relatively independent of the social practices it partly conditions. Giddens analysis of time and space attempts to deal with this through different concepts of time but ultimately structure becomes reducible to human agency.

Structuration theory is increasingly being used to inform research in the area of qualitative information systems as a framework for interpretation (Walsham, 1993; Orlikowski, 1992). The inability of the theory to deal with relatively autonomous features is a problem when discussing technology and this is taken up in section 2.6. Structuration theory is taken seriously in this project. The recursive relationship between agents and structures forms a major part of the argument and Giddens sensitising precepts are recognised. However, in bringing technology into the

argument there is a need to recognise the partial independence from human agency of some explanatory elements. The categories adopted by critical realism provide a helpful orientation.

Critical Realism

At one level, critical realism is a common sense form of argument. Baert (1996) puts it as equivalent to M. Jourdan's realisation that he had been speaking prose all his life. But it has a distinctive methodology which can be quite precise (Lawson 1997, Bhaskar 1989, Keat and Urry 1975, Baert 1996) and which uses many of the insights of structuration theory, though it has developed alongside, and largely independent of structuration theory. In Economics, critical realism has developed in opposition to positivist accounts using closed systems. It thus has attractions for those interested in the importance of institutions since it can potentially provide a theoretical and methodological framework more consistent with the framing assumptions outlined above.

Empirical realism attributes reality only to empirical entities. Scientific realism asserts that the ultimate objects of scientific observation exist for the most part independent of, or at least prior to, their investigation. *Critical* realism has a structure of 3 domains (empirical realism has only the first 2), the actual, the empirical and the non-actual. The actual is the events and states of affairs themselves. The empirical is our experience of these events. The non-actual or deep domain refers to the structures, mechanisms, powers and tendencies which govern events. The non-actual is not necessarily accessible to observation. Furthermore, our experience of events is often out of phase, that is events are often unsynchronised with the mechanisms or powers which govern them, thus it does not follow that causal mechanisms can be reduced to constant event conjunctions. Explanations, it is argued, should refer to structures, mechanisms, powers or tendencies and to open systems, that is systems which do not have a closure condition such as equilibrium in neo-classical economics. Individuals in open systems have freedom to choose but have mechanisms, powers and tendencies operating upon them. Open systems are those in which different outcomes are possible. There are no closed, law-like powers which determine, for example, the market equilibrium. Thus the possibility of choice in human action is recognised as a key assumption of the methodological framework. Tendencies are transfactual statements about what is going on at a deep level, irrespective of the actual outcome, for example gravity is acting even when an object is held. A tendency, on

this definition, is thus an unconditional statement about a power that is being exercised whatever events ensue.

These distinctions are helpful. It is an assumption of the analysis undertaken in this project that the world is open. The concept of a tendency is also valuable. A routine, as the term is used here, is the manifestation of a tendency. It is the empirical referent of a tendency. The research will show that routines operate at a deep level in organizations. Routines are recurring practices but there is no certainty that they will be adopted. Factors may be operating which preclude their adoption. The tendency to act in a particular routine way will not have disappeared but will have been counteracted by other features.

In critical realism, inductive and deductive law-like statements are rejected in favour of retrodution (or abduction, an idea drawn from Peirce (Mirowski 1987) one of the founding figures of "old" institutionalism), in which explanation is made by drawing attention to metaphors or analogies with mechanisms which are familiar, in order to understand new phenomena. The metaphor can never be completely appropriate. It is a way of using existing knowledge to contemplate explanations of phenomena less understood. If the metaphor begins to be treated as truth - hence forcing concepts and observations together unacceptably - then the use of it becomes problematic.

Metaphors have been used widely in organizational theory as a way of providing interesting insights into new interpretations, new ways of thinking and of seeing (Morgan, 1986). Walsham (1991b) uses them directly, though rather mechanistically, to interpret information systems development. Indeed it can be argued that the use of metaphors is a part of the nature of interpretation in any analysis both by actors and those interpreting their actions. However, it is important that metaphors are used carefully and self-consciously. They can suggest implications about relationships and processes which need to be consciously assessed. This is true particularly when human characteristics are used in interpreting organizations or institutions, using metaphors of learning, memory and acting, for example.

People are seen as knowledgeable in critical realism but knowledge tends to be practical and embedded in taken-for-granted activities. People's knowledge is bounded by unacknowledged conditions or unforeseen effects. But the social world is pregnant with meaning. In this thesis, interpretive conventions are used to

uncover that meaning but this is compatible with a critical realist position. Whilst the meanings can only be uncovered through interpreting human action, and whilst the action then acts back on the meanings themselves, as Giddens outlines, it is not necessary to argue that social action and structure are irretrievably hermeneutic.

The approach adopted in the following chapters argues that the persistence of social structures is dependent on the practices or activities which the structures help to constitute. Structures do not exist independently of the conceptions or definitions made by individuals. And social structures are only *relatively* enduring. People can change them, hence the dynamic nature of social life. But these structures can have an existence which is independent of any individual and the instantiations of actions in which that individual is involved. Rules and the hierarchy of relationships associated with them - the structure in Giddens terms - interact in a recursive way with human agency. Social rules are drawn upon as generalised procedures of action. They govern, condition, limit and facilitate but cannot be reduced to action (Lawson 1997).

In structuration theory and critical realism there is considerable agreement on the nature of the social world. The primary difference for critical realists is that the objects of science are structured in the sense of being irreducible to events and their patterns. Mechanisms, tendencies and structures are set out as causal factors and are referred to as *intransitive* that is they act independently of the process of their identification. They are irreducible to our knowledge of them and in some part endure and act independently of our knowledge of them. Thus critical realists reject hermeneutics as a complete methodology.

Structure and agency are interdependent. Structures are necessary for agency to exist but it is agents who reproduce the structures. Agents, themselves can also change and, whilst agents are knowledgeable, it does not follow that all change is intentional. Changes - and consequences - can be unintended. Baert (1996) argues that critical realism is not a transformational model - it accounts only for reproduction. Transformation needs to take into account people's ability to develop discursive knowledge, he claims. The research supports the claim that we must be conscious of the reflexivity of human behaviour and sees action, following Giddens, as a continuous flow of conduct which is reflexively monitored.

Causal factors can be unobservable - part of the non-actual world. Such an approach is commonplace in the natural sciences where the existence of such factors

is deduced from their effects. Analysis of this kind enables us to look for tendencies and structures and attempt to explain them. The explanation of routines here draws on these categories and adopts the realist ontology that the objects under study in some part endure independently of our knowledge of them. As an orientation or logic with which to analyse social activities, structuration theory can provide helpful insights which warn against simple uni-dimensional explanations. It has been used helpfully in the information systems literature and in developing a theory of technology but it struggles to address the material nature of technology, which a realist interpretation can more readily take into account and it is to that I now turn.

2.6 Analysing technology

The research looks at change in organizations to try to understand the way in which routine behaviour affects change and is affected by change. Technology is a major focus both because technology is a key exogenous variable used in orthodox economics to account for change in firms, and because strongly technological-determinist accounts are commonplace in common sense discourses about change in late-twentieth century advanced economies and require investigation. The research endogenises technology by building into the account a theory of technology and the way it is used which is compatible with the underlying theory of change processes.

Some commentaries imply that we are undergoing a new industrial revolution. Does technology drive - or is it merely an enabler? Could the changes we see have occurred (differently) without electronic systems? A fascinating and thoughtful source which reflects this discussion is Zuboff (1988). She shows how the potential of information systems makes visible previously hidden aspects of organizational processes and may have a significant effect on the way individuals learn about their work:

“To fully grasp the way in which a major new technology can change the world ... it is necessary to consider both the manner in which it creates intrinsically new qualities of experience and the way in which new possibilities are engaged by the often conflicting demands of social, political and economic interests in order to produce a ‘choice’. To concentrate only on intrinsic change and the texture of an emergent mentality is to ignore the real weight of history and the diversity of interests that pervade collective behaviour. However, to narrow all discussion of technological change to the play of these interests overlooks the essential power of technology to reorder the rules of the game and thus our experience as players.”
(Zuboff, 1988 p 389)

These issues have only relatively recently been seen as an important element in understanding the kinds of electronic information systems which feature in this research. In the early work in this area information systems were seen as part of the technical arena. Work was concentrated around issues of design and development and even when processes of use were discussed they tended to be seen as primarily technical. Lewin (1952), for example, suggested that implementation of information systems could be seen as a three phase process involving “unfreezing”, “moving” and “refreezing”. The process outlined was a simple one and referred essentially to the assessment of needs and problem definitions (unfreezing), the definition of objectives and solutions (moving) and the evaluation of new systems and transfer to the client (refreezing) (Ginsberg, 1979). Implementation was seen in terms of organizational change but this was interpreted as getting the results of IS work into the hands, or minds, of managers so that decision-making by those managers changed (Schultz and Slevin 1979). The model used was compatible with Chandler’s view of change processes and the implementation of predetermined patterns was the central concern.

Such an approach was challenged as resistance to information systems was experienced in the 1960s and 70s. The key developments which appeared in response to such challenges were initially to examine the complexity of the implementation process itself (Kolb and Frohman 1970). Ginsberg (1979) emphasised that the diverse perspectives of project participants should be taken into account. Their judgement of success was seen as a key measure. In particular Ginsberg argued that management scientists should not be the only source of data in research as they had been hitherto. However, it was not until the 1980s that social rather than technical issues were picked up (Keen 1981, Markus 1983). Keen noted the pluralism of organizational decision making and commented upon the link between information and power. He ended with a plea for more political studies of information systems and argued that case studies are a legitimate and much needed part of IS research. Markus centred on political dimensions. She examined a number of theoretical perspectives, which differed in their assumptions about systems and organizations, in the context of a particular case study and concluded that an explanation which considered the complex interaction of the system and the context of its use was to be preferred. Markus clearly brought a socio-political dimension into the mainstream. Her analysis recognised different interests within organizations but her comparison of the different theoretical interpretations of those perspectives was somewhat simplistic.

Kling and Iacono (1984) adopted a more complex socio-political approach. They demonstrated that key actors manipulate organizational ideologies in order to increase power and control. Kling and Iacono comment upon understanding the *intentions* of key players and are in no doubt that interests and meanings within an organization are varied and relevant to information systems. The emphasis on participants and users which developed at the beginning of the 1980s was taken as the central focus in later work. Srinivasan and Davis (1987) argued that process models are themselves inappropriate and are incapable of capturing the implementation issues involved in latest technologies. Such considerations also allow the analysis to be broadened still further to include notions of equity and evaluation. Lyytinen and Hirschheim (1987), Symons (1990), Joshi (1991) and Walsham (1991a) in different ways all pick up on the broader issues. Symons concept of multiple perspectives, which is also adopted by Walsham, puts the perspectives of participants, and the way they make sense of their worlds, centre stage but analyses them through an interesting range of multiple theoretical approaches. This builds on the earlier approaches though Symons' theoretical perspectives come from a wider set of traditions and she takes a deeper and more sophisticated stance.

Theoretically and methodologically the approach of analysts has become more complex both in terms of the factors seen to be relevant and in the way in which they are studied. The philosophically simple (though frequently technically complex) models which were in use during the first two decades concentrated on the solution of basic, technical computing issues. Simultaneously, as these issues became more tractable, so organizational issues became more compelling. Users were less willing to accept neat technical solutions to somebody else's problems and so attention switched to the human, social and political dimensions.

Thus the analysis of electronic systems within organizations is now seen to require a consideration of the interplay of technical, social and historical factors.

Zuboff (1988) sets out the complexity of this kind of approach in the quotation cited above. In her analysis she has invented the term "informating" to characterise some of the inter-relationships. Informating has parallels in automating. Whilst automating took mechanical effort out of production and changed the lives of workers, informating changes the relationship between the worker and the product by creating new qualities of experience and by making visible information which was previously unknown or known to only a limited group.

Alongside this, other reflections on information systems point out the benefits of, for example, computer assisted learning, or flight simulations to learning - codifying what was previously an uncoded skill, or point to the potential of Artificial Intelligence systems suggesting that learning is not just instantiated in the information systems but in the information technology itself - that we may be able to build intelligent systems (Jones, 1994). The nature of agency is questioned here. If the information technology itself, in some senses, embodies learning it becomes necessary to consider the extent to which technology can be considered an agent in its own right.

Orlikowski (1992) sets out the argument for using a structurationist approach in carrying out this kind of analysis. She looks at the dualism, represented by the human use of technical systems, of material and social, and shows how the relationship between agency and structure is a recursive one. In this analysis routines can be considered as (incompletely) institutionalised practices formed and changed within a structurationist interpretation. Whilst Orlikowski's arguments are fluent and persuasive the case-study she uses is not compelling. Nevertheless her use of structuration and similar attempts to integrate these theories into established analytical approaches to information systems (Walsham, 1993) give a useful model on which to approach the complex technical and social interactions found in information systems. A number of different approaches are used. Walsham is a major and articulate proponent of the use of concepts from structuration theory and for the use of structuration as a meta-theory, taking Giddens' claims for structuration as a sensitising device seriously. He has used concepts from structuration theory in analysing a number of cases and, at the meta-theory level has used structuration as a perspective "within which to locate, interpret and illuminate other approaches" (Walsham and Han 1991, p 81). Whilst this breaks away from technologically determinist accounts, it implies the existence of a taken-for-granted knowledge which different theoretical positions can help to uncover and that the facts of the cases are uncontroversial. It is important, however, in using ideas as illuminatory devices on case material to recognise the theory-laden nature of the research process itself. The epistemological implications of this must be recognised. Giddens argues that epistemology is unimportant and that structuration theory is trying to establish the ontology of social facts, which is fine if the objective is to sensitise. But if these ideas are used in social *research*, knowledge claims are important. We cannot simply apply structuration theory to established facts because the choice of those facts is determined by the theoretical position and values of the researcher.

Orlikowski (1992) effectively recognises the epistemological issues by explicitly making structuration theory the underpinning framework of her analysis. She sets out a duality of technology which parallels Giddens' duality of structure. The duality of technology identifies technology as a product of human action. Technology is physically constructed by actors working in a social context and socially constructed by actors through the meanings they attach to it and by the ways in which they choose to use and deploy it. The structurational model of technology then has 4 parts. Firstly, technology is the outcome of human action such as design and development; secondly, it facilitates and constrains human action through the provision of interpretive schemes, facilities and norms; thirdly, institutional properties influence human interaction with technology, through, for example, intentions, professional norms and resource availability and fourthly, interaction with technology influences the institutional properties of organizations through reinforcing or transforming structures of signification, power and legitimation. This model thus builds a layer into the conventional structurational approach around the significance of technology. Within the conventional approach technology would be included in the two categories of structure and agency. By specifying the model more precisely, Orlikowski creates insight into the way in which technology operates as a constraining, enabling and legitimating device and she is able to emphasise the inherently social nature of technology. Furthermore, given the propensity for modern information technologies to break down conventional ideas of space and time, and given Giddens concern to encompass space and time, there is a potential for rich analysis.

There are difficulties, here, too, however (Jones 1998a). They arise from the material nature of technology as defined by Orlikowski. If technology is a material entity it is more than, or different from, the traces in the mind of Giddens' structures. The material nature of technology, whilst still open to interpretation, cannot be reduced to the instantiations of agents' actions. Routines, norms or rules which are embedded in the technology, but which are recursively flexible, similarly have a real existence.

Orlikowski recognises this difficulty (Orlikowski 1995) and distinguishes between technologies as artefacts and technologies-in-use. Technologies-in-use are the patterned interaction of a technological artefact and human action, the technological artefact being the physical nature of the technology. This is a useful distinction. It enables Orlikowski to show how the same physical technology can be used in significantly different ways and that the differences which amount to a different kind

of technology (in use) are accounted for by the differences in human systems and agency in the two cases. Once the differences-in-use become embedded in the physical artefact, however (in Orlikowski's example this would involve physical developments in the use of the software, Lotus Notes) then the distinction no longer holds. A different technology-in-use has produced a different artefact. The analytical framework showing recursive relationships between structures and agents actions remains appropriate but it has to be seen as having an existence separate from the human agents involved.

Technology, in the form of electronic systems, is implicated in many of the changes observed in the firms studied in this project. For all the companies it was a significant feature but was then used and interpreted in different ways in the different companies. The technology cannot be interpreted independently of the people who work with it (Latour 1996a, 1996b). Latour contrasts technical and social determinism and argues that a synthesis is vital: "The first one took humans as irrelevant; the second tried to circumscribe the non-humans as much as possible. The third follows as far as possible, and in all its consequences the impossibility of allocating humanity and non-humanity in the first place" (Latour 1996b, p 299). Different views existed in the companies about the value of the technology and the companies found themselves pulled in different directions. Disagreements were not usually explicit. They arose as grumbles or comments on how things might be. In some cases the use of modern information technology was so much a part of the way of doing things that no alternative approach was considered. Technology in this sense was not a technical feature but a demand for service or a form of relationship. Technology as artefact and technology-in-use (Orlikowski 1995) were inextricably mixed. The technology did not so much have an impact on organizational routines (and the use of the word "impact" has an implicit element of technological determinism) rather it was constitutive of them. That is not to say that technology was more important than human behaviour but that an attempt to separate technology from human practices and meanings diminishes the importance of all and fails to capture the inextricable connections between them.

Thus, in the companies analysed here, the appropriate interpretive framework is neither technologically-determinist nor socially-determinist. The material and social features of the cases interact so that human action is constrained and enabled by the technology but the technology is interpreted and changed by human agency. Jones (1998b) following Pickering (1995) argues that this approach incorporates material agency in the "double mangle" of human agency and interpretation. That is social structure is not embedded in technology in an inflexible way nor is there an

imputation that machines can possess intentionality. Human interpretation can be seen, in the cases which follow, as central to the design, implementation and use of information systems. The interpretations depend upon the social and technical interactions which are themselves path dependent. The character of technological systems is “as ongoing artefact-in-construction through the situated practice of knowledgeable agents” (Jones 1998b, p 16).

2.7 Categories and a framework for understanding routine behaviour

This final section of Chapter 2 draws together the categories which have been highlighted so far and summarises the explanatory framework which will be adopted in subsequent chapters.

Four broad categories have been distinguished in the discussion: structure, agency, technology and routines.

Structures have been identified as rules and relationships. Relationships are economic or organizational and connected to the position of agents. In the following chapters three different levels of structure will be used. The discussion will concentrate on the rules and organizational relationships of the different firms. However, the rules or structures of the market will also come into consideration alongside the rules or recipe, to use Spender’s term, of the industry to the extent that can be discerned.

The consideration of human agency will focus on the position of the agent (linking to structure) and in particular strategic agency. The skill of the agent will be an important factor and the particular skills will be set out in the relevant chapter. The reduction of uncertainty has been highlighted as a feature of agency, using Giddens’ concept of ontological security, and this notion will also feature in the analysis.

Technology is analysed in a separate section in each chapter. The underlying questions ask about the extent to which technology can be considered an agent in its own right and to what extent it is constitutive of the firm. The empirical detail will include informing, the way in which the use of electronic technologies affects the firm’s boundaries with its customers and suppliers and the relationship with staff, featuring in particular the development of teleworking. There will also be reflection

on the nature of product innovation in some of the case study companies and the extent to which this relies upon leaps of faith.

Routines will be described and the ways in which they operate and are reproduced and changed will be the primary focus of each chapter. Operational and strategic routines will be identified.

The analytical framework is recursive and evolutionary. It emphasises path dependency, the reflexivity of human agency and seeks out underlying tendencies.

In searching for empirical routines the appropriateness of Nelson and Winter's categories can be assessed. Short run operating characteristics are broadly compatible with what will be designated here operational routines. Decisions about the firm's capital stock are narrower than the concept of strategic routine which is used in the analysis here but those decisions form part of that routine and are at a strategic level. Investment and innovation are, for the most part, strategic and there are clear overlaps and connections. The empirical evidence cannot always be separated into neat categories however and we shall see operational and strategic implications in the same routine behaviour.

Nelson and Winter's routines which seek to modify operating characteristics and their concept of search are harder to identify. Conceptually such activities exist but in practice they fall into the reflexivity of the human agents and cannot be easily set out as routines. It is clear, however, that some companies are better at promoting reflexive behaviour than others. Their abilities arise from the interaction of all the features under consideration with history and associated path dependency a significant contributor.

This is neither an empirical framework nor one based on pure deduction or induction. The categories have been selected by moving backwards and forwards between the events and interpretations, described by participants in the fieldwork, and the literature and theoretical models which have been proposed as explanations of behaviour in small and medium-sized firms. The framework has emerged from the fieldwork. It is therefore specifically based in the behaviour of four organizations. It can provide a departure point for theorising more widely however, and has potential value beyond the particular organizations analysed.

Chapter 3: Research Methods

3.1 Introduction

Qualitative work has been carried out in the social sciences for a considerable period, but it has only relatively recently achieved any prominence, outside cultural anthropology, as doubts have arisen over the epistemological claims of the crude use of quantitative methods and qualitative methods have become accepted (Van Maanen 1979a). Interpretive work, as part of qualitative methodology has slowly evolved (Altheide and Johnson 1994). By its nature, each interpretive study will be different, but there is now a corpus of practice upon which economists can draw in order to acquire a rich picture of economic institutions. In using case studies as one form of the interpretive method, the detail will be specific and relate to a particular case, but it can be used to build theory (Eisenhardt 1989) and to improve understanding (Van Maanen 1979b) and neither is it incompatible with other research methods (Hari Das 1983; Bryman 1989).

The research process is different from that typically carried out in orthodox, econometric methodologies. In particular, analysis is not the last phase of the research (Tesch 1990). Analysis and data gathering are carried on in parallel and the research is grounded in its object of study (Glaser and Strauss 1967). As in all intellectual activity, interpretive analysis is both systematic and reflective, but here there is a need for the researcher to be particularly self-conscious about the nature of the research and to reflect on it as it proceeds. The researcher is attempting to make sense of the interpretations of others and must be aware of the influence of himself or herself on the research process. Consciousness of the context of the research and the cognitive models held by those contributing is also vital. Once collected, data - in this case primarily research interviews - are segmented, categorised, and compared. The comparisons are used to find conceptual similarities and to refine categories that grow out of the research. Manipulation of the data is relatively eclectic, requiring leaps of imagination, though there are systematic procedures (many now computerised, one of which was used here) that can guide the analysis to a higher-level synthesis identifying patterns, themes, structures or fundamental practices. One such set of practices could be a system of routines, but it is important in work of this kind not to impose that framework on the data collection. Patterns arise from the data and are interpreted by the researcher.

Fieldwork and its interpretation can explore the meaning of terms and allows us to develop, elaborate and challenge the concepts used in theoretical accounts.

Theoretical categories have to be related to the way people conceptualise their own economic behaviour. The underlying question is not so much “how much does this change?” or “what is the precise relationship between this and that?” but rather “what have we here?”

Different fieldwork methods are available from participant observation to pre-coded questionnaires. The method adopted here falls at the relatively unstructured end of that spectrum. Participant observation was not possible for practical reasons: the research was carried out part-time and studied four organizations. However the research is predicated on a requirement to make sense of the interpretations of others rather than to test a pre-conceived explanatory framework. The most appropriate fieldwork method was therefore a series of lightly-structured interviews and observations. A limited number of cases made it possible to develop a rich picture of each case. Semi-structured interviewing allowed the respondents to participate in the development of the research agenda.

A key part of ethnographic styles of research is accounting for ourselves (Altheide and Johnson 1994). This chapter will trace through the processes undertaken in the research. It begins by setting out the reasons for the choice of research sites and then traces the interpretive process through three further sets of interviews and the interpretation and analysis which surrounded them. It concludes with some brief reflections on the research methods adopted.

3.2 The initial selection of research sites and establishing interviews with senior respondents

Since the research was concerned with discovering routines, it was necessary to investigate firms which were undergoing change so that any unchanging behaviour could not be explained as a static equilibrium or compatibility with an unchanging environment. Relatively enduring characteristics had to stand out from the changing world of the firms. If the organizations were not undergoing change, in some senses all behaviour could in principle be considered routine. The same things would tend to be done in much the same way on each day or month or year. But such routine behaviour is not necessarily an important practice within the organization; it may be easy to change and have little implication for the way the organization's members view the way they do things. When the environment is changing, routines, if they existed, as the established, significant, sanctioned and recurrent practices within organizations would stand out as important features. By definition, they would be

the things which do not change or change much more slowly than other forms of behaviour. There should be a regularity and predictability about them.

A focus of the research was the implication of changing technologies for firms and a range of engagement with technology was therefore required, and because the research was concentrating on change, a longitudinal approach was required in order to observe change and to seek out reasons for the changes and the enduring characteristics of the companies. Each firm would be studied over a period of about $2\frac{1}{2}$ years in order to observe the changes the firms underwent and to analyse the changing relationships and structures within them.

In planning the research therefore I decided to concentrate only on firms in the Cambridge area. This meant that any differences between the firms were unlikely to derive from geographical variations. Furthermore because the Cambridge area is noted for the development of high technology it should have been relatively straightforward to find firms engaged in high-tech work. The particular area of high-technology chosen, because of the growth of interest in it and its apparent potential for change, was electronic technologies linked to the dissemination and diffusion of information. The fieldwork began, in July 1994, just as the internet and the world-wide web were beginning to creep into general consciousness.

The research sites were selected after a good deal of searching and a number of unsuccessful approaches to other firms. From the beginning selection was based on a limited number of criteria. The firms chosen had to offer potentially interesting forms of behaviour related to high technology. There should be differences between the firms but, if possible similar characteristics too, to enable contrasts and comparisons to be drawn.

Four firms were selected because this was a sufficiently large number to enable contrasts and comparisons to arise whilst being manageable within the longitudinal approach which was planned.

Finally I decided to look at small or medium sized enterprises employing 50 to 100 people so that it would be possible for me to get a sense of the organization and to speak to employees throughout each organization. I would also be able to compare companies without finding interpretations of their behaviour swamped by a big company effect based on experiences remote from the research sites.

I had a number of contacts with small and medium-sized firms throughout the greater Cambridge area from personal friendships and acquaintances. I also looked at the local business press and listened to business items on the local radio to spot firms which might form sensible research sites. Colleagues working in this broad area at Cambridge University also suggested possible collaborators.

The most fruitful route into firms came through personal contact. Whilst a number of firms, whose leading staff I knew well were unable to participate, they all responded positively to my requests but for different reasons were unable to join in at the particular time I needed them. Others agreed to participate as outlined below. Cold calling was difficult. One of the firms ultimately selected came from what was virtually a cold call but even there I had a hint that some interest might be forthcoming from the firm's readiness to help in other ways.

The four firms which participated were Digital Equipment Company Ltd., National Extension College Trust Ltd., Unipalm Group PLC and Chadwyck-Healey Ltd..

Digital was drawn to my attention by a friend who knew of my interest in companies undergoing change involving high-technology. In 1994 Digital were moving to a form of home-working and I was given an electronic introduction to an engineer at the company. He in turn gave me the name and e-mail address of the senior manager responsible for the new developments and mentioned my interest to him. I wrote to the senior manager, Ray Costello (no relation to the author), and subsequently met him following a pattern set out below. Digital did not match my criteria precisely. The East of England Centre in which I carried out the research was part of a larger group owned by an American multi-national but the company adopted a policy which provided considerable autonomy to its Regional Centres and the story seemed to be sufficiently interesting to take the risk. Interestingly the big company effect was to play a major part in the story which unfolded at Digital and this is taken up in the next chapter.

The National Extension College was the last company I recruited but I shall comment on it second because that is the order in which it falls in the analytical framework which is adopted in subsequent chapters. The NEC is a charity which provides educational courses primarily through distance learning. In early 1994 I was trying to find an organization which was planning or had just begun to

implement a new information system. The other firms which had agreed to participate had all been using electronic technologies for a number of years and I wanted to find a company which had little experience so that I could observe the implications of using high-tech systems, as near as possible, for the first time.

As an employee of the Open University I was invited, in the Spring of 1994, to a celebratory dinner for those people who were to be awarded honorary degrees by the Open University at a degree ceremony the following Saturday. My invitation stemmed from a long-standing friendship with one of the honorary graduands. Ros Morpeth, Director of the National Extension College, whom I knew only by reputation, was to receive an honorary degree at the same ceremony. During the course of the evening I mentioned my research interests and reflected on the difficulty of finding suitable fieldwork sites. Ros immediately offered the NEC. I wrote to her the following day to check that she was prepared to allow me access to the NEC and subsequently adopted the NEC as a suitable location.

In some respects the NEC presented difficulties for the research. At this time the college was in the very early stages of information systems implementation and it was tremendously helpful to be able to observe the effects of a new information system as they happened. But the NEC's business as a distance-learning provider was very familiar to me. The NEC was the elder sibling of the Open University. It would be difficult not to carry knowledge about the methods used at the OU into an analysis of the NEC. The industry recipe appropriate to the OU was broadly the same as that with which the NEC operated. Both are distance-learning institutions. The OU operates almost entirely in higher education, whereas the NEC has a much wider range but there was risk that the analysis would slip into assumptions about practices, drawn from OU experience, which were not appropriate at the NEC. The familiarity was also a benefit, however, insofar as it made acquiring a sense of the company's purposes more straightforward.

I tried to be self-conscious throughout the research, but particularly at the NEC, of categories I was developing and why, and to try to avoid creating categories for respondents. This was difficult to maintain at the NEC since in many respects the conversations held there took on many features of discussions between colleagues. We had many contacts in common and a broadly shared set of beliefs about the values of distance education and appropriate ways of carrying it out. It is almost certainly the case too that some NEC respondents modified their comments because

they were talking to their younger relative from down the road who had grown so big and powerful.

Unipalm came to my attention through the business press. It was beginning to expand rapidly and was planning to float on the stock exchange. An acquaintance, the husband of a colleague, had approached me a few months before to ask for advice on developing distance-learning programmes through which a department at Unipalm would teach computing skills to its clients. I was invited to dinner and met Peter Dawe, then the joint Managing Director of the Unipalm group. Through that social contact I was able to approach Peter and to ask his permission to use Unipalm as a research site.

Finally Chadwyck-Healey was recommended as a company which may be interesting by a colleague from the Judge Institute of Management Studies at the University of Cambridge. I wrote to the Chairman of the company, Sir Charles Chadwyck-Healey, and he agreed to discuss the company's participation with me.

After getting in touch with the senior person at each company by letter, I arranged to visit the company and to discuss with them the particular interests I had. Both parties could then decide whether collaboration over a two or three year period was potentially interesting. In each case I gave a brief presentation of what I intended and gave a short written summary. I asked the senior person for background on the organization and took extensive notes. I also asked for any reports or other published papers which may be available.

The purpose of these initial establishing interviews was to obtain background information about the companies to make sure they were suitable research sites and to build confidence within the company that I would not interfere in their work and that discussing policies with me and taking time out may be helpful to them as a sounding board or an opportunity to clarify thoughts. At this meeting I asked for permission to use the company's name which was granted in each case. The initial interviews were not recorded.

In addition to setting out the broad objectives of the project I also set out the way in which I would like to proceed in future. I asked that I should be able to visit the company approximately every six months over a two year period. At each visit, lasting a day or two days, though the two days of time may be spread over one or

two weeks, I would interview a number of staff, including the senior person, forming a “diagonal slice” of the organization. Thus I would interview an employee on a tier below the senior person but, if possible, who did not work directly to the senior person. I would also interview employees in tiers below that, each reporting to a different person from the one interviewed in the tier above them. Thus I would get a sense of the breadth and depth of the organization. I asked the senior person to recommend suitable colleagues and in all cases they came up with a list with whom they had checked willingness to join in.

The participants were thus selected by the senior person. Potentially the senior person could have selected a sample of people who had a particular view of the company. I had no easy way of selecting on any other criterion but, in practice, the individuals selected were all people who were happy to express their own views and did not take a company line or act as company apologists. Asking for a diagonal slice was one way of making the selection of respondents relatively open since the senior person was unlikely to have detailed contact across that range. I also asked that a mix of relatively recent employees and people of longer vintage should be selected if at all possible and in the main that was also achieved, thus giving me potentially a range of views and experiences and limiting the opportunity to “fix” the sample. I have no reason to believe that the sample of respondents was chosen for any reasons beyond those I specified, though clearly such a selection process almost certainly omits any notorious or maverick views.

The four companies selected provided an interesting range of contrasts and comparisons. Two were concerned with technology as their core business, Digital and Unipalm, whilst two used technology but were less focused upon it. This second category, NEC and Chadwyck-Healey both operated for a major part of their work in the publishing business which provided the potential for comparison. NEC had only just begun to use information systems but Chadwyck-Healey used electronic technologies in significant ways for its main business. These things were known before the major part of the fieldwork began and were reasons for the choice of companies. Subsequently other similarities and contrasts became clear and these will be discussed in chapters 4 to 7.

3.3 The first round of interviews with all participants

Once the initial relationship with each company had been established, the research followed a pattern broadly in line with that recommended by grounded theory. Strauss (1987), for example, lists the main elements and research phases he

regards as appropriate for grounded theory. His lists are more mechanistic than the flexibility which is required in practice and he sets out an idealised version of what can be a complicated process requiring subtle judgements and an ability to think on one's feet. But as a framework such recommendations are helpful.

The first set of interviews was aimed primarily at developing categories. Analysis of the transcripts showed that a number of categories were emerging. The second round continued the same broad pattern but identified changes, if any, and by building on the developing relationships with the interviewees sought to get behind any facade which had been erected. The third round again continued that pattern but also checked the emerging categories with participants.

The first round of interviews with all respondents took place between the beginning of January and the end of March 1995. Each company was visited in turn in the order Digital, Unipalm, NEC, Chadwyck-Healey. The interviews were informal and lightly structured. The intention was to find out what respondents believed was going on, what was driving change and why. Specific questions were asked about information technology and respondents were asked to reflect on the next 6 months. Figure 3.1 is the interview checklist which was used for this first round.

Figure 3.1: Interview Checklist 1

About interviewee

1. Present position 2. Previous career 3. How long with organization

1. About organizational structure

1.1. *Images of organization*

What model of the organization do you carry around in your head? What images do you use?

Do you see your organization as a network, hierarchy, political organization, bureaucracy, machine, organism, brain, culture...? (Only suggest these metaphors if respondent has difficulty with (1.1) and avoid leading questions).

1.2. Decision-makers

Who do you think are the key groups/individuals in policy making?

How do they relate to other groups?

1.3. Informal processes

How do informal processes work?

1.4. Involvement of individuals

How involved are you, as post holder, at a strategy/policy level?

How involved, as post holder, would you like to be? - formal, informal, subversive, political.....

2. About learning

2.1. What have been the most important changes in the organization in, say, the last 3 years?

2.2. How have those changes come about?

2.3. Are there things which should have happened which didn't? What were the sticking-points or the main resistance to change?

2.4. Why was resistance shown? Ask for descriptions of particular blockages.

Was the problem one of **framing** - seeing the problem exists - or of **reaching decisions** or of **implementing**?

3. Significance of electronic systems

3.1. What electronic systems do you use?

3.2. Why were electronic systems adopted?

- Efficiency - how measured?
 - response times?
 - information retrieval or generation?
 - effect of internal or external environments?
 - competitive pressure/costs?
- Impact on costs? (figures)

3.3. How have these affected *internal* structures and relationships?

3.4. How have these affected *external* structures and relationships?

- with suppliers
- with customers or clients
- with competitors

(Identify extent to which external and internal structures and relationships appear to be merging).

Interviews were usually carried out in a meeting room rather than at the respondents work location though the senior persons at NEC and at Chadwyck-Healey both preferred, and were interviewed in, their own offices. Because of homeworking at Digital the interviews with the homeworkers were carried out in the foyer of a nearby hotel or in a “touch-down office” whilst, for those based in the small suite of offices, the interviews took place at their desks.

None of the interviews was difficult in personal terms. Each respondent had been asked to take part and had agreed. Each was interested to find out what my intentions were and I began each interview with a very general explanation about looking at change in organizations. All interviewees agreed to be recorded and for their names to be used in any analysis. (Occasionally, in subsequent interviews, some participants asked for items to be discussed off the record and I then stopped recording during the more confidential discussion.) My intention was to get interviewees to talk about themselves and the work they did and through this to reveal answers to the questions in the checklist. Respondents were happy to do this and each interview frequently went on beyond the hour which had been notionally set aside. I did not offer opinions or critical comment. I wanted the interviewees to talk so that I could gather information. The interview style was as

open as possible with comments put back to the interviewees, such as “So you did that.....”, in order to encourage further exploration of comments. I wanted the respondents to determine what issues they believed to be important.

Before the first round of interviews I carried out only a limited amount of desk research on each company. I wanted to have a sense of the company so that I came across as knowledgeable and having an intelligent interest in their affairs but I did not want to pre-judge the issues which would come out of the interviews. Consequently most of the background reading took place after the first interviews and was partly informed by them.

Once the interviews had been completed at a particular company I sent a summary of my notes on their interview to each respondent along with a letter of thanks and a request for comments or corrections. Only Ros Morpeth (the Director of NEC) responded with any suggestions and these were largely of an editorial nature. (Ros had spent many years as an editor before taking on her present post.) I noted her comments and they helped me to interpret her sense of what she had meant during our discussions. I did not assume that no reply meant the respondents were in full agreement with my notes, rather the notes were not significantly out of line and were not of sufficient importance to the respondents to be bothered making comments. The notes sent did not include asides to myself about possible connections between firms or individuals or possible theoretical explanations, nor did they include my sense of the attempts which were made by respondents to position themselves in the story. The notes were my best attempt at recording the comments which had been made by the respondents. Whenever possible the notes and thanks were sent by e-mail. For the first round of interviews this was not possible at NEC nor Chadwyck-Healey. E-mail felt less formal, made relationships more easy-going and made use of one of the focal points of the research, which seemed an appropriate thing to do.

Before leaving the company after the interviews I made contact with the individual who had helped me to set up the interview schedule. This was usually the personal assistant or equivalent to the Director. I checked that arrangements had been satisfactory and explained that I would be in touch again in about 6 months time. These contacts proved invaluable in arranging subsequent programmes of activity and in being a source with whom I could check ideas informally.

The interviews were then transcribed and analysed and coded using NUD*IST¹ software which is particularly suitable for non-numerical qualitative data. The coding was modified with use and the activity of coding and segmenting the interviews acted as a valuable tool for focusing ideas and driving the work. After this first round, some initial thoughts were determined about each company and about the process I was undertaking and this was written up in a paper (Costello 1996).

3.4 The second round of interviews with all participants

The second set of interviews with all participants took place between the middle of July 1995 and the end of November 1995. The company order was different. NEC staff were unavailable in the early Autumn and so Chadwyck-Healey staff were interviewed third, followed by the NEC. The gap between interview rounds at NEC was therefore rather more than 6 months. Questions were based around what had happened since my last visit, with some reminders of the predictions made by participants at that visit. Participants were asked why change had taken place, what things had not happened which might have happened, how their jobs had changed and why, where power and influence lay, how good communications were and what impact electronic communications had, what might happen in future and why. Figure 3.2 is the checklist which was used.

Figure 3.2: Interview Checklist 2

About interviewee (if necessary)

1. Present position 2. Previous career 3. How long with organization

1. Changes

1.1. Tell me about the changes which have happened

¹I discussed different computer-based analytical systems with a range of colleagues, followed up a number of publicity contacts and tried out a number of packages. NUD*IST was the most flexible software then available and matched the style of research proposed very closely. It was highly recommended by a number of active researchers. Subsequently, I attended a weekend workshop on its use.

1.2. Last time you said, “.....”. Has it been important?

2. Important Factors

2.1. Which factors have been important in enabling or impeding change?

2.2. How has technology contributed to this?

2.3. How has technology or specific changes in technology affected:

(i) work?

(ii) relationships with suppliers or customers?

(iii) the organizational structure?

2.4. Why was resistance shown? Ask for descriptions of particular blockages.

Was the problem one of **framing** - seeing the problem exists - or of **reaching decisions** or of **implementing**?

3. What next?

Some staff changes had occurred. The senior person at Digital, Ray Costello, and one other respondent there, Sue Wiseman, had been made redundant. Ray continued to participate and a substitute respondent at the same level in the organization as Sue was found. Two members of staff at Unipalm were about to go but both were available for this round of interviews. At NEC some changes in responsibilities had occurred and an additional interviewee was drafted in. The participants at Chadwyck-Healey all remained in post. The selection of the new interviewees was made by me in discussion with the individuals concerned.

Relationships with respondents felt very easy. The interviews were relaxed and I was treated like an old (and I believed trusted) friend. Respondents were less guarded. Interviews took place in similar locations to those used previously. Less care was taken (by respondents) in determining the location, reflecting their more relaxed attitude and the reduction in their desire to impress. Ray Costello was interviewed in his home.

Notes and thank-you letters were sent out as before (no comments or corrections were received in this round) and the interviews were transcribed, segmented and coded.

3.5 Company stories and the third round of interviews with all participants

Following a thorough, detailed reading of all the interview transcripts to date and attempts to find patterns in the behaviours described, a story was prepared for each company and secondary sources such as company accounts, web-sites, newspaper articles and financial summaries were consulted. A deeper analysis of the NUD*IST database was carried out and further consideration of the research interviews was undertaken tacking backwards and forwards between the data and the developing story. This was an iterative process.

In writing stories I was acknowledging the impossibility of an entirely objective or scientific discourse. The economic and other theoretical categories were also being placed in the narrative. Strassmann and Polanyi (1995) argue that reconceptualising economic practice as storytelling is important. Here I attempted to be self-conscious of the situated position of the knowledge I was creating.

The stories made use of the participants' own words. The words were selected by me and the selection was based on the interpretations I made of the participants' accounts. However, in reflecting on Hall's claim that language is a privileged medium (Hall 1997), it was important to allow the participants to make their own statements as much as possible, and to be open about the data which were being drawn upon.

The stories were developed one by one, beginning with Digital and then moving through the companies in the original order of interviews. As each story was completed a third round of interviews was carried out. This began with Digital in

April and May 1996 and finished with Chadwyck-Healey in October to December 1996. The initial questions were similar to those in the second round but the participants were asked to make comments upon my initial attempts at analysis. Did the ideas or metaphors seem right to them? Figure 3.3 is the checklist used in this round of interviews.

Figure 3.3: Interview Checklist 3

Interview checklist (round 3)

The following checklist is to be used in the context of a clear picture of the company's position in the previous rounds. If necessary respondents should be prompted on what the position was like previously.

1. What has changed?
2. What has stayed the same?
3. What is the [*company*] way of doing things? How has this changed?
4. What are the characteristics of a typical [*company*] person? How have these changed? How much are they the same?
5. Is the style of doing things the same at each level? Has this changed? What has stayed the same?
6. What are the primary sources of change? Internally? Externally? (Note that the interpretation of such sources comes through the company's culture.)

Relationships were very comfortable. I felt I was being given "honest" answers, whilst recognising that there was some positioning going on. I was able to argue and challenge participants, sometimes quite forcefully, and one of these stronger discussions with Sir Charles Chadwyck-Healey, the senior person at his

eponymous company, is reproduced in Chapter 7. The more forthright nature of the discussion and the reflection of the interviewees on my categories enabled me to go back to the emerging explanations and to fill them out with further evidence. Strauss (1987) would call this saturating the categories by which he means “the core category must be proven over and over again by its prevalent relationship to other categories” (Strauss 1987 p 35).

The interviews were carried out, in the main, in similar locations to those used in previous rounds. At Digital, Ray Costello was interviewed in a restaurant close to the location in which he was carrying out consultancy work. A further Digital respondent, Mary Bain, had left the company and was interviewed by telephone. Unipalm had changed considerably, however. Only one of the original respondents remained at the company. Two had left and could not be contacted. Two had left but were able to make themselves available for interview. One, Peter Dawe, the senior person, was interviewed at his home, the other Bill Thompson was interviewed in an Open University office. Paul Rivers, from Unipalm, was interviewed in his office. He had not previously had an office but the company had expanded to a new building and Paul had increased his status. Some of the explanation for the change in Paul’s position is set out in Chapter 6.

The interviews were transcribed, segmented and coded once again and further analysis using NUD*IST was carried out. The coding used changed a little after the first round of interviews but the pattern set there remained the basic framework. Some codes were merged with others and some were dropped. The interpretation of some codes changed and the relationship of the different categories to each other shifted as it became clear that some codes were subordinate to others and others largely independent. The facility in NUD*IST to attach memos to documents and codes was helpful. It enabled me to keep an account of the way in which my interpretation of each code changed and to highlight significant examples of particular actions or interpretations by respondents.

The final list of codes and their relationship to each other is listed in Appendix 3.1 at the end of this chapter. The groups of codes and their ordinal relationships are indicated by the identifying numbers and the descriptions. Thus 1 is super-ordinate to 1.1 and 1.2 which in turn are at the same level as each other.

Using NUD*IST acted as a discipline. Transcripts had to be manipulated technically in certain ways in order to be compatible with the software. There was then a logic

in proceeding through the segmenting and coding of the transcripts systematically. This helped to pace the research and built a sense of achievement into the analytical stages which was a valuable motivator.

Deeper analysis of the transcripts was then possible. Text which was coded under both (2) "Electronic Systems" and (4) "Routines", for example, could be selected, retrieved and examined more closely. In practice, I found it easier to examine the selected text in hard copy and to highlight interesting passages, than to carry this out at the computer. Glancing backwards and forwards and scanning surrounding text on paper proved simpler for me than working at the machine. The opportunity to search for such linkages and to focus down more precisely, for example on the "organizational routine" subtree, and to print out the relevant passages was immensely valuable.

But the software did not carry out the analysis. It influenced the procedures followed but the success or otherwise of this activity depended on the initial segmenting and coding I had undertaken and the decisions I made about selection and retrieval. Those things would have been different without the software and this set of activities provides a partial microcosm of the relationship between technological and social systems discussed in the research.

3.6 Company stories again

After completing the final rounds of interviews the company stories were revisited. They were modified in the light of the data available and then taken apart to emphasise patterns which related to the development and reproduction of routines. At this stage the chronological account of what happened in each company was less important than coming to each story to establish the nature of routines there and to compare and contrast the experiences and practices of the different companies. These accounts were then developed into chapters 4 to 7 here which trace different features of routines and their reproduction through the 4 companies. Each chapter is situated in a particular company and carries a specific responsibility for the development of the argument about the nature of routines in companies like these.

3.7 Reflections on method

The interpretive methodology required me to be self conscious about my position in the collection and interpretation of data, which, as set out above, were inter-

connected as the analysis emerged from the continual comparisons of grounded data and possible explanations. It also required me to stand back from the accounts given by the respondents and to put my interpretation on them according to my sense of the different messages they were giving about themselves and the organization. The diagonal slice of respondents in each company gave me opportunities to check accounts from different perspectives and to compare them with informal conversations and published documents.

The interviews were all carried out with an approach which was trying to elicit information. In briefing the respondents I explained that I wanted them to tell me what they believed to be going on, that I had no pre-formed agenda. Some junior members of staff were surprised I was interested in their ideas, but in fact, in trying to unpack their taken-for-granted assumptions, I often found what appeared to be the key to underlying structures and cultural meanings. Junior staff tended to reveal their sense of the organization more readily through their statements about what went on. One more senior respondent, Stephen Pocock at Chadwyck-Healey, commented that he never prepared anything for our meetings and that he simply told me what he felt to be true. He said this half apologetically but it was this sense of the taken-for-granted, sanctioned and established practice that I was trying to discover and such comments are reassuring.

My sense of my own position in the data collection was clear to me, and I felt, increasingly as the research proceeded, that the respondents were comfortable with it. I did not claim to be knowledgeable about their business and never passed judgements on the activities I observed or matters discussed. Even in the third round, where I was testing out ideas, that was done to seek information. Questions were then along the lines of, "Does this concept match your understanding of that issue?" or "Can you really justify that sense of the way this company operates? Can you give me examples....." I always dressed in a way I judged would be seen as appropriate at the particular company. I tried to achieve an understated but serious appearance and to create a warm and empathetic relationship.

As a middle-aged man from a well-known institution I inevitably brought with me a certain status and I behaved in a way which made it clear I expected to be taken seriously. I believe my age and status (and possibly gender) were of considerable help in opening up discussions. There were some occasions, with some respondents, where I perceived a wish by respondents to be seen in a particular light, some of which related to their perception of my status and position. One

respondent, for example, affected the position of a cynical commentator, another appeared to me to be positioning himself as a go-getting, successful and dynamic innovator. In general, however, positioning was subtle and implicit. Some staff simply enjoyed talking about their work and I believe I was able to open up communications and gain their confidence, partly by presenting myself as a dependable and honest person from a reputable background, who would not betray their trust. Their positioning was then, in many cases, no more than that which occurs in normal social intercourse between acquaintances who both trust each other and do not have a big investment in the relationship. At the NEC, as already mentioned, this was underlayed by a relatively close relationship between the Open University and the NEC and by personal connections between the two institutions. I had to be particularly conscious of my influence on the interviewees there. This affected two respondents in particular: Ros Morpeth, the Director, who had a personal and professional investment in several networks with which I was connected, and Rita Bond, a relatively junior member of staff who had previously worked for the Open University. In neither case did this issue become a problem but I had to behave in slightly different ways in the two cases. With Ros I was a professional colleague and with Rita a confidant.

This should not be taken to imply that all interviews and interviewing relationships were problem free. I found one interviewee a very warm character and it was easy to be seduced by him and to use his interpretation of events as the true picture. In a different company I was somewhat overawed by the senior person and found it hard to avoid being deferential. A third participant was extra-ordinarily dynamic and this too was very seductive. With hindsight, the extent to which I allowed the participants to allocate me the role of friend, supplicant and excited onlooker enabled me to gain their confidence and increase their trust. In examining their statements, however, it was important to withdraw from those roles.

It is important also, therefore, in research of this kind to be self conscious about the role of the researcher in the interpretation of the data. I was trying to identify a rich and complex social ontology. Richness and complexity were not difficult to find but in imposing patterns on that data I had to avoid reinterpreting my observations to match the theoretical categories I found appealing, simply because I found them intellectually satisfying. Rich theoretical categories are difficult to find in data of this kind. There are no lumps of social material waiting to be picked up and examined. The stuff of the research rests in interpretations by the researcher of interpretations given by the respondents in fleeting moments which in many cases did not seem

significant until several months after the interviews had taken place (when the examination of the transcripts of the interviews was undertaken).

The continual, relentless rewriting of the stories of each company was central to the development of explanatory patterns. There was a risk in this that the patterns became theoretical figments of imagination and the stories had to be regularly checked back with the data. Going backwards and forwards between the data and the emerging explanations is an important part of the interpretive process. The explanatory framework is thus continually re-grounded. The refining of categories took away some of the complexity and subtlety of the fieldwork observations but slowly the patterns set out in chapters 4 to 7 took shape. A number of categories and explanatory frameworks changed significantly during this process. It slowly became clear that critical realist categories, in particular the idea of a tendency, were a helpful orientation though the distinctions in many critical realist accounts (Lawson 1997) are sharper than observation can provide. In particular the problem for social theorists of taking into account the material nature of technology kept reappearing. In the fieldwork it seemed clear that technology was implicated in human action beyond an explanation concerned solely with the human interpretation of technological artefacts and that is the reason for consideration of these issues in the previous chapter.

The next four chapters now move on to the actual research carried out, beginning in chapter 4 with an analysis of Digital and how “new” routines there were embedded in path dependent processes.

Appendices

3.1 Data Codes

***** (1)
/Learning practices
*** Definition:
How learning occurs
***** (1 1)
/Learning practices/Organizational memory
*** Definition:
Organizational memory and change
***** (1 2)
/Learning practices/Constraining routine
*** Definition:
Copy of node 25 13. Routines which hinder change
***** (2)
/Electronic systems
*** Definition:
Electronic systems relationship to change
***** (2 1)
/Electronic systems/Control by computer
*** Definition:
Use of computer systems to control
***** (3)
/Human systems
*** Definition:
The way in which human systems interact with producing effective routines
***** (3 1)
/Human systems/Individuals
*** Definition:
Individual contribution and attitude to change
***** (3 2)
/Human systems/Staff attitudes
*** Definition:
Staff attitudes to change
***** (3 3)
/Human systems/Flexible working
*** Definition:
Allusions/references to flexible working
***** (4)
/Routines
*** Definition:
Examples of/implications for routines
***** (4 1)
/Routines/Old routines
*** Definition:
Implications for change of old routines
***** (4 2)
/Routines/New routines
*** Definition:
New routines and their development
***** (4 2 1)
/Routines/New routines/Designing routines
*** Definition:
Active design of new routines
***** (4 3)
/Routines/Enabling routine

*** Definition:
A routine the company implies gives them an advantage
***** (4 4)
/Routines/Constraining routine
*** Definition:
Routines constraining change
***** (4 5)
/Routines/Personal routine
*** Definition:
Routines at the level of the individual
***** (4 6)
/Routines/Organizational routine
*** Definition:
Routines at the level of the organization
***** (4 6 1)
/Routines/Organizational routine/Communications
*** Definition:
Internal communications issues
***** (5)
/Company
*** Definition:
Company level issues
***** (5 1)
/Company /Reasons
*** Definition:
Reasons for change at company level
***** (5 2)
/Company /Attitudes
*** Definition:
Company attitudes to change
***** (5 3)
/Company /Work pattern
*** Definition:
Implications of change for working patterns
***** (5 4)
/Company /Boundaries
*** Definition:
Reflections related to company boundaries
***** (5 5)
/Company /Structure
*** Definition:
The relationship between company structure and change
***** (5 6)
/Company /Management style
*** Definition:
The relationship of management style to change
***** (6)
/External influences
*** Definition:
Influences related to the world outside the company
***** (6 1)
/External influences/Perception by company
*** Definition:
The view of the outside world from the company

***** (6 2)
 /External influences/outside's perspective
 *** Definition:
 Perspective from outside the community under study
 ***** (6 3)
 /External influences/Recipes
 *** Definition:
 Evidence for/influence of an external recipe
 ***** (20)
 /Definitions
 *** Definition:
 Company names, interviewees etc.
 ***** (20 1)
 /Definitions/Digital
 *** Definition:
 Respondent connected with Digital
 ***** (20 1 1)
 /Definitions/Digital/Ray Costello
 *** No Definition
 ***** (20 1 2)
 /Definitions/Digital/Mike Beetham
 *** No Definition
 ***** (20 1 3)
 /Definitions/Digital/Mary Bain
 *** No Definition

 (20 1 4) /Definitions/Digital/Rosemary Foreman
 *** No Definition
 ***** (20 1 5)
 /Definitions/Digital/Sue Wiseman
 *** No Definition
 ***** (20 2)
 /Definitions/Unipalm
 *** Definition:
 Respondent connected with Unipalm
 ***** (20 2 1)
 /Definitions/Unipalm/Peter Dawe
 *** No Definition
 ***** (20 2 2)
 /Definitions/Unipalm/Bill Thompson
 *** No Definition
 ***** (20 2 3)
 /Definitions/Unipalm/Paul Rivers
 *** No Definition
 ***** (20 2 4)
 /Definitions/Unipalm/Rob White
 *** No Definition
 ***** (20 2 5)
 /Definitions/Unipalm/Sarah Broker
 *** No Definition
 ***** (20 3)
 /Definitions/NEC
 *** Definition:
 Respondent connected with NEC
 ***** (20 3 1)
 /Definitions/NEC/Ros Morpeth
 *** No Definition
 ***** (20 3 2)
 /Definitions/NEC/Robert Leach

*** No Definition
 ***** (20 3 3)
 /Definitions/NEC/Steve Ellis
 *** No Definition
 ***** (20 3 4)
 /Definitions/NEC/Rita Bond
 *** No Definition
 ***** (20 3 5)
 /Definitions/NEC/Alan Broadway
 *** No Definition
 ***** (20 4)
 /Definitions/Chadwyck-Healey
 *** Definition:
 Respondent connected with Chadwyck-Healey
 ***** (20 4 1)
 /Definitions/Chadwyck-Healey/Charles Chadwyck-Healey
 *** No Definition
 ***** (20 4 2)
 /Definitions/Chadwyck-Healey/Stephen Pocock
 *** No Definition
 ***** (20 4 3)
 /Definitions/Chadwyck-Healey/Duncan Christelow
 *** No Definition
 ***** (20 4 4)
 /Definitions/Chadwyck-Healey/Alistair Laidlaw
 *** No Definition
 ***** (100)
 /Working
 *** No Definition

3.2 Notes

1. In the quotations which are used in the following chapters the following conventions are used:

..... indicates that the text has been edited because I judged the words omitted to be unimportant for the developing argument.

[inaudible word] indicates the tape recording was inaudible at that point and it has been impossible to transcribe the words.

Square brackets containing other text, such as [will be], indicate words added by me to enable the reader to make sense of the extract quoted.

Interviewer, or Int. in the quotations refers to statements or questions made by me. The content of my questions or statements is included when I judged it helpful to enable the reader to make better sense of the discussion or when my participation in the discussion was an important part of the developing story.

2. During interviews I attempted to minimise the impact the act of recording had on them. This meant in most cases that a microphone was placed close to the interviewee and my questions were picked up on that microphone. On some occasions I was sitting too far from the interviewee for my questions to be completely audible on the tape. The result is that the transcription is not a full record of the whole conversation. I noted the questions in my notes and kept full notes of all interviews. The imposition caused by the technology of fieldwork and the problems of resolving it are thus demonstrated. I tried in different ways to minimise that imposition and I am comfortable that the lack of a tape record of some of my comments and questions did not compromise the analysis.

Chapter 4: Digital, the evolution of new routines

4.1 Introduction

In the mid 1990s, the East of England office of the Digital Equipment Company was undergoing considerable change. In coping with that change it fundamentally re-organised its way of working. It moved from operating in a conventional office block to a structure based upon staff working from home. The senior manager in the East of England at the time of the change described it like this:

“.....this new way of working was a great imposition on people's lives, people who'd been working with one *modus operandi* for thirty or forty years were suddenly being asked to do, in their life, something completely different. But to work in a way that was going to impact, you know, their whole life, you know. And it wasn't just your thirty seven and a half hours a week. It was going to impose seven days, twenty four hours either by virtue of a change in use of part of the house or whatever.....”

The focus of this chapter is to examine how the company was able to achieve that significant shift and to put “a great imposition on people's lives...being asked to do...something completely different”. Staff were required to adopt different practices. Getting out of bed in the morning and going to work was very different in the new circumstances. I shall examine how the “new way of working” was incorporated into the company and how *meanings* of what it meant to work at Digital were used to effect the change. The new working practices which will be examined here are at an operational level. They are concerned with the day-to-day work of staff and the maintenance of the organizational structure not with the company's place in the wider environment. The company called this style of working “flexible working”. It has a specific meaning at Digital and will be defined later in this section. The chapter will explore the extent to which these shifts can be considered to be the creation of a new operational routine. People's lives clearly changed. The micro-routines involving, for example, sitting in a particular office and responding to colleagues requests in a particular way, shifted significantly. But to what extent can the broad set of operational practices be regarded as new? This is the primary focus of the chapter. At a more general level, therefore, it investigates how operational routines are created and reproduced.

At the same time as the company was undergoing these significant organizational changes, it was also reviewing its product strategy. A surprising contrast came out of that review. The company had been selling “flexible working” as a consultancy product since the end of the 1980s but in the review of the product portfolio a

decision was made to drop it. This chapter will consider that contrast. Analysing the apparent contradiction of the company adopting a particular set of working practices - a new routine - whilst simultaneously dropping the equivalent consultancy product from its product portfolio helps to clarify the different factors which are involved in the creation and maintenance of routine behaviour. It is not being argued here that dropping the product was a routine action but an analysis of the factors which bore upon that decision helps us to understand routine behaviour more clearly.

This chapter is the first of four which present an empirical investigation of routines. Here I shall focus upon the creation and reproduction of operational routines. The investigation is carried out primarily through the analysis of interviews with staff of the company. Quotations from the interviews will be used extensively to show what kinds of behaviour appeared to be taken for granted and what interpretations were made by those involved in the changes under consideration.

Background to the company

Digital Equipment Corporation (DEC) began its life in 1957 as a manufacturer of computer equipment. In the early 1990s both the market it inhabited and the technology it used and produced were changing rapidly. As an innovative company some of the changes arose partly from its own behaviour.

DEC was founded by Ken Olsen, a technologist and a Quaker, in Maynard Massachusetts. The company was a spin-out from the Massachusetts Institute of Technology and Olsen established it using the same kinds of principles as other well known Quaker business families such as Cadbury and Lever involving a caring, if paternalistic, interest in employees. It was founded upon advanced and innovative technology. For example, it launched the world's first small interactive computer in 1960 and in the late 1990s was still setting world standards with its Alpha system. During the 1960s and 1970s computing was technical, expensive and the province of experts. Digital was very successful during this period and grew massively. Its VAX range launched in 1977 set an industry standard. By 1983 the company employed over 70,000 people world-wide. This grew to a peak of over 125,000 in 1989.

In 1991 however, the company posted its first ever loss, of \$617 million. This worsened rapidly. In 1992 the company lost \$2,796 million and losses continued

until year ending 1st July 1995 when profits of \$121 million were earned. By 1995 the total number of employees had declined to 61,700.

The UK subsidiary is the Digital Equipment *Company* Ltd.. It was formed in 1964 and in 1995 employed just over 4,000 people. Together with the Irish subsidiary (employing only 450 staff) it accounted for nearly 10% of the company's world-wide revenues in 1995 (Digital brief guide 1995). The UK company was thus a sizeable part of the overall DEC operation.

In responding to its declining profitability at the beginning of the 1990s, the parent company took a number of steps. A new President and Chief Executive Officer, Robert Palmer, who came from a manufacturing background in IBM, was appointed in October 1992. The company was reorganised in 1993 into business units and there was a realisation that it was over-staffed by industry standards. According to the 1993 Annual Report, Digital was transforming itself into "a leaner, more responsive, more competitive corporation with a new organization, new technology and - most important - a new focus on the customer." Furthermore, "This focus wasn't just imposed by management; it bubbled up through the entire company" (Digital 1993, p. 4). It is easy to be cynical about such rhetoric, but discussions with Digital staff confirm that individuals were given considerable freedom. It was possible for changes to be initiated by staff and for such initiatives to make a difference to work patterns and products offered by the company.

The financial position of the UK company is shown in Table 4.1 overleaf. Turnover declined from £875 million to £732 million in the five years following the first trading losses for the parent corporation. Losses were high and the overall picture was gloomy. Employee numbers had fallen by over 40% over the same period. The fieldwork was carried out during the period in which the company was beginning to move back into profit but the staff interviewed were very cautious about drawing any positive conclusions from the improving figures.

Fieldwork was carried out in Newmarket, one of Digital's UK offices. In 1992, the Newmarket office was one of 18 Digital locations within the UK. The Newmarket office was responsible for Digital business in the East of England. It carried out conventional sales and service functions and also had a staff of business consultants. The consultants were largely autonomous. They generated their own business as well as picking up leads which came into the company. Consultants were not obliged to provide solutions which used Digital equipment for their

customers. Activities were agreed broadly with managers but the primary criterion was to carry out work which generated revenue for the company. The fieldwork concentrated on the work of the consultants.

Table 4.1 Digital Equipment Co. Ltd., Company Financial Profile

(All figures are given in thousands of £ except where stated; columns refer to the financial year ending in the month indicated.)

Source: FAME Financial Analysis Made Easy Database.

	06/97	06/96	06/95	06/94	06/93	06/92	06/91	7 yr average
Turnover	721,678	666,725	731,513	800,944	809,449	799,543	875,414	772,180
Profit before Tax	-19,615	-19,004	-35,212	-62,235	-97,427	-29,113	-7,192	-38,542
Net Tangible Assets	166,597	152,905	188,499	226,369	296,169	349,258	374,802	250,657
Shareholder Funds	102,225	85,520	121,840	155,885	219,143	316,946	340,371	191,704
Profit Margin (%)	-2.72	-2.85	-4.81	-7.77	-12.04	-3.64	-0.82	-4.95
% return on Shareholder Funds	-19.19	-22.22	-28.90	-39.92	-44.46	-9.19	-2.11	-23.72
% return on Capital Employed	-11.77	-12.43	-18.68	-27.49	-32.90	-8.34	-1.92	-16.21
Number of Employees	3,508	3,184	4,031	4,977	5,720	6,166	6,833	4,917

The more senior consultants also had management responsibilities. The precise combination of different kinds of work was complex but, in simple terms, a manager had an obligation to generate revenue as well as to manage a group of staff. Thus any manager was required to carry out activities, in this context within the consultancy area, as well as to manage the work of colleagues. The overlapping responsibilities of managers for staff in their own geographical location and in their own technical specialism created complexity. The senior manager in Newmarket, when the fieldwork started in July 1994, was Ray Costello. Ray Costello was

responsible for the whole of the Newmarket operation and was manager for “flexible working practices” throughout the UK. Consultancy in flexible working was relatively labour intensive and required little hardware. Each project was relatively small and therefore, in absolute terms, generated relatively little revenue.

As outlined above, studying the establishment and continuation of flexible working practices, how these practices became routinised, formed the core of the fieldwork at DEC. “Flexible working”, often referred to as “teleworking”, has a specific meaning there. It does not refer to part-time insecure work but to flexibility in the location in which work is carried out. In the company’s own words, from the company’s flexible working brochure (Digital 1992), the activity is explained in this way:

In the UK, a desk in an office now costs around £6 000 a year - and that is before you pay an employee to sit at it. Facts like this are leading many employers to take a long hard look at how people work within their organization.

..... Digital’s integrated approach is to rationalise the business needs as well as the employee’s needs. At the business level, opportunities are identified to improve the organization’s overall performance. At the people level, employees are asked to identify ways of improving - or eliminating - the work they do.

And the third element - technology - is the enabler to help people work more effectively and thus benefit the business.

Flexible working is a new approach to developing environments where work is performed in the most effective way.

Work can be carried out:

- In an office
- At home
- At customer or supplier sites
- In the car
- In community offices
- In ‘tele-cottages’
- In business centres at airports or motorway services
- On the train

- From UK locations, or from Europe, or around the world.....
.....at any time.

(Digital, 1992, p 3)

With responsibility for the product portfolio relating to flexible working practices throughout the UK, Ray Costello had developed a range of customer-focused consultancy skills. This is sometimes called the soft end of consultancy. Costello was a skilled computer technician but his interests had moved to the human-computer interface rather than the hardware.

At the end of 1992, because of the difficulties facing the company, the continued existence of Digital's presence in the East of England was being questioned. Costello, along with other colleagues, proposed that the East of England centre should adopt teleworking practices and agreed that their substantial office block, for which the lease had come up for renewal, would be closed down. This was championed by Costello who had the consultancy skill, the network of contacts within the company and the personal management skills with his colleagues to convince DEC to turn the East of England operation into a telecentre.

The telecentre opened in 1994, just before the fieldwork began, in new premises, above the company's warehouse, containing a small co-ordinating staff, plus a number of "touch-down offices" in which teleworkers, of whom there were around 80, could reserve desks for their visits to the centre. Staff were provided with advanced communications links in their homes and a structure of group meetings and informal contacts was established to co-ordinate and manage the operation successfully. The move to teleworking was justified primarily in financial terms. Annual accommodation costs for Newmarket dropped from \$1 million to \$110 thousand (Interview with Ray Costello, January 1995).

When the fieldwork started in 1994 there was a sense of apprehension but some excitement and relief about the new arrangements. There were changes needed to some of the physical and staffing arrangements but within the limits of the building these were in hand. The building itself was an enormous change from its predecessor - several rooms above a warehouse on a small industrial estate, in comparison with a large office block near the centre of the town. A number of staff had been working from their homes for some time and the formal institution of the telecentre made their circumstances much better. Mary Bain, a business consultant,

described her move to Ray Costello's area of responsibility in July 1994 as "exceptionally positive". However the financial circumstances of the company were insecure and it was shedding labour as shown in Table 4.1. There was already some uncertainty about the development of flexible working practices as a product, although this was not apparent to me as observer for some time, and one of the key individuals in this area had taken a severance package to set up on his own.

Around 9 months later, the company was just about to open its sixth telecentre, but finally decided to drop flexible working from its product portfolio. Business consultancy continued but flexible working was no longer part of it. The new procedures for teleworking were in place and new routines were developing. Because consultancy on flexible working practices was no longer a company product, Ray Costello was made redundant in April 1995. It was widely acknowledged that he had been an insightful, supportive and productive manager. The staff who worked with him had great admiration and affection for him and saw his leaving as a significant diminution in their ability to carry on.

Ray Costello made himself available for interview over the following 18 months and continued to comment on his (now outsider's) view of changes at Digital, as well as the potential for flexible working as a product. He set up a consultancy, which he then merged with a bigger group, and continued to offer flexible working practices as part of his own consultancy business.

Teleworking thus became established as an important form of organization at Digital and other major locations moved to teleworking but as a consultancy product, flexible working practices were abandoned. Digital pioneered flexible working as a business solution and offered it as a part of its consultancy services for over seven years. Simultaneously with its move into teleworking for its own staff, however, the company concentrated its product strategy on hardware.

The rest of the chapter will trace out the development of flexible working as an operational routine and will analyse why the internal process became incorporated whilst the consultancy product has been abandoned.

Staff directly participating in the research at Digital

Five staff from the Newmarket centre participated in the research:

Ray Costello, the senior manager for the location and responsible for flexible working as a product throughout the UK.

Mike Beetham, a highly qualified technical expert with many years experience. Mike was organizationally responsible to Ray Costello for his day to day work and managed teams of consultants within his own specialisms.

Mary Bain, an experienced business consultant, responsible to Ray Costello but with no staff management function of her own.

Susan Wiseman, based at the telecentre and responsible for co-ordinating the work of a group of teleworkers. She reported to Ray Costello and provided personal assistant support for him. She was also made redundant in April 1995.

Rosemary Foreman, who carried out similar functions to Sue Wiseman but reported to Mike Beetham.

In practice the responsibilities of the staff changed during the course of the fieldwork and the descriptions above are approximations to give a sense of the relationships and relative positions involved. Costello, Beetham and Bain all worked from their homes, which, for example, in Bain's case was 40 miles from the telecentre. Wiseman and Foreman were based at the telecentre.

Costello and Wiseman leaving had an impact on the morale and working practices of those remaining which clearly influenced the responses they gave to my questions and the sense they had of the company's culture. There was disillusionment, for example for Mary Bain who found herself without clear management lines, a huge sense of loss for Mike Beetham, who put in enormous effort to maintain the staff-support practices which existed before Ray Costello left, and a feeling of disbelief from Rosemary Foreman.

4.2 The creation or evolution of a new routine?

Between 1992 and 1996, flexible working or teleworking became established as a standard company practice at Digital. With hindsight it appears to be a rational, clear-sighted choice which saved the company money and enabled staff, who were in any case mobile, to work in ways which better suited their personal circumstances. The staff concerned were sales and support staff plus consultants. Such staff are mobile in the sense that a good part of their work inevitably takes place away from their office base.

But this is too simple an explanation. Teleworking as a concept had to be argued through. There were other more conventional alternatives, such as moving functions to fewer locations, reducing staff numbers thereby and gaining economies by concentrating work in fewer buildings. The financial circumstances presented an opportunity for new working practices to be tried but a simple correlation between financial stringency and new forms of working does not help us to understand why this particular form of working was developed. As set out in chapter 2, routines are seen here as established, significant, sanctioned and recurrent practices within organizations. How and why did teleworking, rather than some other set of practices, become established, significant and sanctioned at Digital?

Flexible working practices had formed part of the consultancy portfolio for some years and a good deal was known about them before the Newmarket location moved to teleworking. But it was not straightforward to transform a major office location into a telecentre and there were implications for the wider company which were significant. Teleworking is a pattern of work in which the employee works from home or some other remote location using computer networking and carefully co-ordinated support systems. It makes use of complex computer-driven communication links, which are absolutely central to its operation, but the key features of successful teleworking relate at least as much to the organizational procedures and networking facilities (in human terms rather than computer terms) which are developed alongside the communication hardware and software, as they do to the computer power itself.

Ray Costello, as quoted at the beginning of the chapter, put it like this:

“.....this new way of working was a great imposition on people's lives, people who'd been working with one modus operandi for thirty or forty years were suddenly being asked to do, in their life, something completely different. But to work in a way that was going to impact, you know, their whole life, you know. And it wasn't just your thirty seven and a half hours a week. It was going to impose seven days, twenty four hours either by virtue of a change in use of part of the house or whatever.....”

and then continued:

“..... there's absolutely no way you can move forward unless the infrastructure is in place within the organization, and that isn't a superficial sort of blob that's stuck on the end of your organization, it's the infrastructure - however you interpret it, it has to be endemic, it has to be seen as a thread throughout your organization. So in other words the telecentre could be seen as a bespoke piece, a discrete piece rather hanging on the end of Digital, but for me it was endemic because policies, procedures, all the links and threads were right back through into Digital very deeply. It

wasn't just a front to the flexible workers. And the development from that onwards would obviously be four and five and six tele-centres so it really is endemic, wherever those people went in the UK, as flexible workers within Digital they were recognised and the infra-structure supported them for their telephony and data, voice comms, whatever help they needed. So they could talk to an HR manager in Warrington and that HR manager - if they're working there for the day - would understand fully the issues that they'd got and whatever. So that's the next piece.

And the third for me is the technology. A lot of companies today seem to think that they can move into virtual working by virtue of the technology's here now, isn't it, the Internet now makes it possible, doesn't it? Well no, it doesn't. For me I still advocate the technology as an enabler, a simple enabler and it's getting easier and easier to use....."

Ray Costello is arguing then, that teleworking is a major transformation for the individual teleworker. Conventional domestic space becomes work space. Practices which have been followed for tens of years are changed and the company imposes itself on the worker 24 hours a day. From the company perspective, the process has to be fully integrated in all its locations. Ray's use of the term "endemic" is unusual but appropriate. (He is not a man with a sophisticated vocabulary.) I interpret his statement to mean the routines associated with teleworking have to be incorporated in all the company's locations in such a way that they become natural and taken-for-granted. Teleworkers must be seen as a conventional part of the organization if they are to be able to carry out their functions satisfactorily and, correspondingly, if the company is to get the best it can from them. Finally, and much more low key, the technology is an enabler. It does not drive the process but enables it to take place.

Such comments are unexpected from a manager whose life has been spent getting to grips with sophisticated technology. His claims were borne out by other staff however. For example, Mary Bain's early positive attitude derived from the personal and managerial support she was given. For her the technology was taken-for-granted but not central.

Establishing a telecentre, therefore, required a change in routine behaviour. That is to say the practices associated with work, which had been undertaken for years, had to change both for the individual and the company. The-way-we-do-things-around-here was apparently transformed. The culture and structure of the company had to be amenable (or made amenable) to such changes, as did staff attitudes. But, is this the *creation* of a new set of working practices or the *reproduction* and *evolution* of an existing routine? On the face of it there are major changes here. I shall go on to show, however, that the new working practices recognisably emerged from pre-

existing routines, though they were themselves major developments. The firm did not re-invent itself. It built on existing, taken-for-granted ways of working.

The need to reassure staff was recognised explicitly from the beginning, according to Costello. A great deal of effort was put in to persuading and enthusing Newmarket staff by senior managers, and into developing carefully integrated human and technical systems to make the concept of a telecentre come to fruition. Those staff involved in setting up the new procedures such as Susan Wiseman and Mike Beetham spoke positively about the efforts taken to smooth the changes. Others less centrally involved, such as Mary Bain, were less aware of the detail, though as already observed, Mary found the new arrangements “exceptionally positive”.

Different patterns of working had to be developed giving support to viewing the changes as a new routine. Relatively formal procedures were eventually laid down in February 1994 in a “Flexible Working Handbook” (prepared by Neil Harris, a flexible working practices consultant at Digital who was made redundant a few weeks after the fieldwork started, and subsequently revised by Ray Costello). It is interesting to note that these things were not written down until centres other than the East of England were considering the adoption of flexible working practices. Much of the early work was carried out through small groups in the East of England centre working together and devising appropriate methods. Ray Costello described the initial changes like this:

“But I guess, yes, it was a passion of one person and then within a few weeks a growing band of people, my managers, key consultants who basically started working very pro-actively and then an encouragement of everybody else really. Obviously when you announce something as severe as “Your building’s going to be closed. Within six months you’ll have nowhere to work,” it’s as good as redundancy anyway for most people. This is the end. People find it very difficult to accept it. Let’s go and try this, let’s try that. You get the fatalists, you get the cynics. Usual people in any organization. But I think after about two months of open forums, of going through flexible working with people, the clinics that we set up. Sort of every week we had a clinic at lunch-time. And people were able to come in and sit down and discuss it.”

Although the company had operated with a small number of flexible workers for some time, and at that time offered flexible working consultancy as a product, moving a whole office to such practices was new and resisted. My interpretation is that the threat of office closure, based in the difficult financial situation of the company, focused minds so that reluctant people were willing to give it a chance but the massive change in routine behaviour implied by these proposals required

enormous effort and persuasion. In a later conversation which was not recorded, Mike Beetham was particularly aware of the subtlety of this process and recognised the difficulty of sorting out the problems which Ray Costello's redundancy implied. He saw his own position as carrying on the process which Ray had set up, maintaining, as he saw it, the founding values of the company. Thus whilst significant changes were undertaken, they were seen as emerging from the founding values of the company.

Factors implicated in changing working practices

A number of different factors were implicated in the changes taking place. The changes emerged from existing values but the move to teleworking needed a champion who could operate as a strategic agent. Ray Costello filled this role.

Secondly the skills of the strategic agents had to be right. That is to say agents who had strategic significance for this development in operational routines. Ray Costello's attributes were well-developed for such circumstances. All the interviewees were clear that he was trusted by his staff. He had worked flexibly himself and developed a consultancy portfolio in this area. He had a good network of contacts in the company. Other staff in the East of England, such as Mike Beetham, who themselves had the trust of the company, and were also senior in their own sectors supported Ray Costello's proposals. Their support was seen as important by Costello and recognised as an important factor by the staff concerned. Thus a mix of technical, sales and consultancy personnel supported the broad principles and operated the detailed procedures. Strategic agency was not the province of one person. Other staff participated and contributed to the overall direction of change.

Thirdly the need for security and a clear sense of identity within the staff group concerned, as well as within the wider company, was recognised implicitly. The systems which the East of England team developed used the computing power necessary - and relatively easily available - and mimicked the office environment which the staff were used to. Virtual Private Networks (VPN) were used for example. VPN are telephone systems which enable individual's home lines to be connected to the network of the company. They then act exactly like conventional company extensions. Initially VPN were not available. Individuals had to phone in to Digital locations in the same way as any other "outside" person. Costello claimed that the move to VPN made staff feel a fuller part of the company and meant that people from elsewhere in the company, or from outside the company, could not distinguish flexible workers from conventional workers through their telephone

systems. The technology thus enabled flexible working to be better established. It did not drive the change but made the continuity of it more probable. E-mail and conferencing systems were also set up. Interestingly relatively little use was made of computer conferencing. Originally it had been conceived as a potentially important means of keeping in touch but it did not take off. This is perhaps because it was not part of normal office procedures and did not offer a great deal more than e-mail. Staff had not learned the routines relevant to electronic conferencing prior to the move to teleworking so it was not part of their normal practice. At more mundane levels, the need to adopt conventional practices was made explicit. The "Flexible Working Handbook" (Digital 1994) includes, in its tips for working from home, advice to "replace the ritual of going to the company office with another ritual such as scanning the news headlines" and not to "work on a bed or sofa" or "allow household to expect you to perform domestic tasks during your work hours" or to "forget to stop working". Ray Costello was very formal in his own approach:

"I think, because they've all heard of flexible working or tele-working over there. They ask you what it's like. 'Do you feel isolated?' 'Does your manager support you?' All the usual sort of questions. 'Do you get lots of free time?' They envisage you being at home with jeans and sandals on and it isn't like that. I put my suit on nine o'clock and I work at my desk with my jacket on the back of the chair. It just happens to be the way I like working. No different for me really."

Other activities were modified as the system settled in. A much higher number of telephone calls were fielded at the telecentre by the co-ordinating staff than had been envisaged. Extra telephone-reception staff were employed. When staff met at the telecentre, formal meetings were found to be better attended and much more productive than before. This was something which all staff participating volunteered early in our conversations about the effects of teleworking. The meetings had an important relevance for the staff. Informally, the lack of social facilities at the telecentre meant that some effort was made in devising social events. The coffee bar at the local Tesco store (just across the road) became the common room! Staff readily divulged these little details in their asides about what it felt like to work in the new circumstances. They acknowledged perceived needs to socialise and that Ray Costello's awareness of this meant that managers were making some effort to facilitate such activities. They were not occurring entirely by chance.

Thus informal practices, such as the use of Tesco, and formal practices, as advised in the handbook and facilitated by the technology, were developed. They formed the broad set of working practices which constituted the operational routine for teleworkers at Digital. In general the routine created an environment for flexible workers which matched the environment of the conventional workplace as closely as

possible. The particular pattern did not appear to be one which had been adopted deliberately but was one which staff found comfortable and which emerged and had been built as Ray Costello, in particular, but other managers too, maintained a sensitivity to the detail of working conditions. A sense of personal security in knowing what to expect and a sense of identity was readily maintained by such procedures. Teleworking also used, as its core, a series of technological solutions which matched the employees' sense of themselves as high-tech people. Such methods seemed entirely appropriate for a company like Digital and the staff interviewed did not view them as new or awkward or technologically confusing. They expected to use high-tech solutions and would have found it unusual if the technology had not been sophisticated. It was not conventional at Digital for staff to bemoan their incompetence in the new, high-tech world. Quite the contrary, even relatively junior staff could and did request training in complex up-to-date technological products, even though they may have only limited use for the services provided by those products. For example, Rosemary Foreman had begun her career as a secretary and was in her mid-50s when the interviews took place. She defined herself as very non-technical, and was certainly the least technical person I spoke to in the company, but took many technical things for granted:

Rosemary Foreman: We've now got a training centre set up in Docklands which you can do the Microsoft like the Powerpoint, Word, Excel training and we're gradually, each of us are going on that because you have no backup here, there's nobody, you know, in the next room, on the next floor to say "How do you do this?" So you really have to have a lot of knowledge on your own and and be a lot more self-reliant. Oh very much so here. Very much so. I was mending the kit in the computer room downstairs the other day, phone in one hand, screwdriver in the other. It was quicker than sending out an engineer. And it worked, you know. In two minutes we'd got it up and running. It was a customer kit and we'd got it up and running again.

Such demands were seen as normal. The sense of the company which came out of this was one where the staff interviewed saw themselves as skilled users of advanced technology and expected the company to be at the forefront of technology and associated working practices.

We thus find a complex, new, operational routine incorporated into company norms. It involves working at home, with touch down offices and advanced technology in spaces previously reserved for domestic purposes. The advice offered in, for example, the Flexible Working Handbook, and through formal and informal meetings, plus the provision of advanced technological fixes such as VPN phones mimicked the previous office environment. Some of this was deliberate, as the handbook made clear, and some emerged in use.

The new operational routine drew upon an interaction of structural features and features of agency. The company's market position was threatened which opened up opportunities for new working practices. Company structures were open to flexible working practices as a reflection of the product portfolio which had been developed in this area. However, the position of a number of strategic agents in relation to the power structures of the local organization and the wider company, when added to their competencies, and here the role of Ray Costello was particularly important, meant that the potential solutions for the company were directed towards teleworking. The actions taken by these agents and those they influenced made an outcome which had seemed far-fetched through some eyes become a natural solution. In enacting that solution the largely implicit need to maintain the security and sense of identity of staff produced particular practices, using technology in specific ways, such as VPN telephones which mapped closely to previously adopted patterns of work, and not in other ways, such as computer conferencing, which were not part of the conventional pattern of working at DEC.

The new routine involved a taken-for-grantedness that many Digital employees worked from their homes and that they were provided with touch-down facilities when they used Digital locations. The complex technology which supported this was also taken for granted. (When speaking to Digital employees, right from the beginning of the fieldwork, the conversations were always peppered with references to computer technology.) Personnel and management structures incorporated a formalisation of some hitherto informal activities such as more focused meetings to provide business and social spaces but informal contact also continued in new ways.

The practices which I have grouped together as a new operational routine were not entirely new. It is partly because they built upon expected and accepted values and enabled staff to maintain well-established and taken-for-granted ways of working, for example through the telephone network, that the move to teleworking succeeded. The discussions about teleworking from early in the establishment of the telecentre recognised this, at least implicitly. Ray Costello was determined to set up support networks which had "to be endemic, it has to be seen as a thread throughout your organization". There is therefore an evolutionary process at work here. The particular routine adopted depended upon the interaction of structures, human agents and technology but it was built upon pre-existing patterns of working in a path dependent way.

4.3 The product portfolio

Given the adoption of teleworking as a conventional organizational form for its internal operations, it is somewhat surprising that the company abandoned flexible working practices from its product portfolio. Presumably if Digital found such processes to be important as solutions to the problems it faced, other companies would too. Since the company had adopted teleworking itself, it would be easier for consultants to argue that customers might try the system for themselves. As an organizational form it was saving the company money and there was therefore a straightforward bottom-line argument which could be presented to potential customers. It is valuable to reflect on the reasons why the product portfolio was changed, therefore, in contrast to the adoption of teleworking for internal organizational purposes. Through a consideration of the differences in the two situations it will be possible to see more clearly the factors which operated in creating or developing the operational routine. The review of the product portfolio is not a routine but factors influencing it also influenced the changes in operational practices. The outcomes of the two events are apparently very different. Why is this?

Digital's market had changed through competition as new entrants came into the market and through consumer tastes which had shifted to personal computers and away from Digital's established products. The company had used teleworking effectively but was uncertain whether it presented a major new consultancy market. Its Alpha system of highly sophisticated, leading edge computers was new and fitted into the experience and history of the company as a hardware-focused operation.

It became clear to me from the evidence of the research interviews and the company's reports and brochures that the market was interpreted through this history. The decision to drop flexible working from the consultancy portfolio can be partly explained in terms of the company's taken-for-granted definition of itself as a manufacturer of, and support system for, electronic equipment. The new chief executive came from this background and the choice of chief executive must have been made in the light of the company's perception of its market place. Teleworking did not fit in with pre-existing notions of the nature of the company's products as manufactured computer systems and its associated support, as the following commentary from Mike Beetham shows.

At the time of the interview, 2 months after Costello and Wiseman had been made redundant, Mike had been aware of the risky position of flexible working, as a product, for some time. He spoke of the dropping of the flexible working practices portfolio with a world-weary sense of his pessimistic expectations being fulfilled:

"The problem was that flexible working consultancy, particularly of the sort that Ray saw himself doing, which was talking to business managers about the advantages of flexible working, talking to managers about how you actually address the issues around changing to a flexible working environment, rather than "We've got these super Alpha boxes that mean you can build computer integrated telephony type services into something" were not, just not seen as, one of the key activities in terms of the overall company drive. The organization that Ray and I worked in, up until late October last year, was called Digital Consulting. It was a consulting organization and we were trying to move into high end consultancy as well as the technology end consultancy. We are now called Digital Systems Integration and we're much more technology focused than we are business focused. Business in terms of business consultancy. So the sort of services Ray was ideally set up to sell are not the sort of services, in terms of service portfolio, that fit naturally into what has been determined as our core business. So that's where the problem comes from."

His interpretation of the new approach is done passively - "what has been determined as our core business". He claimed to be relatively disaffected by the changes which had taken place and this shows in his structuring of the argument. He appeared to be losing some of his ability or opportunity to influence the direction of the company. As the financial circumstances bit, there seemed to be a centralising tendency in management and a return to previously defined core business. The move back to the harder end of technology was confirmed by the change of name, from Digital Consultants to Digital Systems Integration.

Mary Bain was a business consultant, that is to say she was involved in looking for business solutions for her customers rather than solutions based solely in technology. She put it in a slightly different way. She was describing the company's preference for what she called "selling tin", that is computer hardware, rather than the softer end of consultancy. She described how the company had moved towards consultancy:

"I think the norms have changed. There is a shift. I think there has been quite a major shift towards the consultancy area. And there is very much an acceptance of this is what it's all about."

But the move to consultancy had been held back by the new found success of the hardware:

"That potentially hasn't been helped, in one sense, by the fact that the Alpha systems have taken off in the way they've taken off. So almost from the move of an organization from selling tin to selling consultancy, you know, they just happened to hit right with this."

The "this" here referred to the Alpha system.

Interviewer: They're going back to selling tin?

Mary: "No they're not going back to it but it's, you know, for those people that have, are halfway there, so to speak, you know, they're got this to latch on, 'cos this is still, this is still going, and this is going well. But they have made a radical shift, as I see it. And there's this acceptance that this shift has occurred and it's what's got to occur. But if one would like to say the tin bit had been going for 25 years, the last bit's been going for 5 years and that I don't think we are expert enough at it yet."

Mary's argument is then, that the company had a set of norms which were to do with "selling tin" and the softer consultancy services did not fit easily. In Mary's opinion, the future lay in consultancy and the company had made a "radical shift" but the market success of the latest hardware had re-energised an area which she believed to be in decline relative to consultancy. There had been a shift back towards the hardware, arising from the historical preferences of the company over 25 years and from the initial success of the new Alpha systems. Business consultancy remained the way of the future but the focus was shifting towards consultancy linked to hardware (which meant, by implication, that flexible working as a product did not fit easily into the portfolio). As a business consultant it is to be expected that Mary would argue the importance of broader consultancy services. Her overall analysis is consistent with Mike Beetham though less polarised. Digital as a company, in her view, had a strong sense of its identity as a manufacturer and provider of associated support services.

Mary Bain had been disillusioned with the general (though unspecified) management practices at Digital from the beginning of the fieldwork. She had found the support provided by the telecentre a major improvement, but the hiatus created by Ray Costello's redundancy was a return to bad old ways. She did not comment on management structures, indeed she professed a healthy disdain for them. She did not regard changes in that area as important for her, provided she was given the support she needed. Her interpretation of events is based around the nature of the products on which the company concentrated: the company had moved to consultancy but were still not expert enough at it and retained a major interest in tin. Mike Beetham's reflections indicate disappointment and apparent loss of control

over the direction he should take: “we were trying to move into high end consultancy” but that is not “what has been determined as our core business.”

The shift to more central control was confirmed by Ray Costello. Formal relationships and processes, which had always existed but had not been exercised, had in his experience, begun to dominate. The senior company hierarchy began to play a more significant part. Ray Costello remained intensely loyal to Digital even after he had been made redundant but he expressed his disappointment at the way in which those formal procedures had been brought to bear. A year after he left he put it this way:

“The direction was very much from the top right down to the individual. Irrespective of, what, two layers of management between the Board and the individuals. And as a senior manager reporting into the Board I had absolutely no responsibility what, or accountability. I had a budget of, where was I, just before I packed my business in, about eleven million revenue, round about seven million expense and I couldn't sign an order for a box of floppy discs for my organization. That had to go up to Board level. I use that as an example, it was that silly. How can you run?.....This was basically, because of the state the company was in, its need to control expense. What I would rather have had was the MD tell me. Ray, this is what you're working to. If you cross this line, Ray, you're out the door. Yes. I don't mind you being that tough. I'd have rather have had that than not being able to manage my organization. Therefore I think people having had years and years of their immediate managers giving them all this support and hand holding and encouragement and a lot of personal development, suddenly saw their managers, their immediate and next line managers, completely defused.I think people inside still cared, people at Board level still respected others but Digital had a job to do and that was the way it was going to do it.”

Ray Costello had worked for Digital for 19 years and had technical and business expertise which gave him credibility. He had developed a network of contacts throughout the company and was regarded highly by them. He proudly displayed awards he had received in earlier work with the company as, for example “manager of the year”, on his office walls. He had started working for Digital in their northern centre in Warrington. He came from the Warrington area and had the down-to-earth warmth and friendliness which is typical of Merseyside. He found it hard to criticise the company and always gave them the benefit of the doubt. A statement, such as this, showing his frustration at the loss of autonomy and control he had suffered is significant. From around 1992-3, formal rules, it appeared, were being more rigorously imposed and the informal relationships, developed over years, were becoming less effective. The company's financial problems seemed to be dominating its espoused values. This was a marked change in management style, according to Costello and Beetham, from that which had typified the company before 1992.

The company's *identity* based on a sense of its core business has parallels in the centralising moves reported by Mike Beetham and Ray Costello. Centralising core procedures and focusing on core business can be interpreted as moving back to perceived core competencies in an attempt to overcome the difficult market position in which the company found itself. Alternative strategies were available. The company could have redefined its business and have concentrated upon developing broad consultancy skills instead of narrowing down. But Mary Bain was open about the company's relative weakness compared with mainstream consultancy firms. Mike Beetham's skills in technological developments were harnessed through a redefinition of his work as systems integration. As Mike indicated this left little room for the flexible working portfolio. The company's sense of itself gave an edge to products rooted in manufacturing.

This need not have been so. Flexible working practices were in demand. Rosemary Foreman, as a team leader at the Digital telecentre, co-ordinating the work of teleworkers and providing clerical and administrative support for them, made the following observation 11 months after Ray Costello had left the company:

"Well unfortunately they decided to get rid of that group. Which again seemed an absolutely crazy idea to us in Newmarket because this is what we were doing. I'm still getting enquiries. Got one here yesterday. I think it was Dublin Airport wanted to try flexible working, tele-working and where do you go to? I ring up the two chaps I know who were in the flexible working group with Ray who don't actually do it officially any more but they usually try and help me out if I get enquiries and I do still get enquiries, at least one a month. "We hear you do tele-working."
.....Really there's quite a lot of interest everywhere. Seems such a shame to me when we've got these enquiries, you know, how do you do it, and we haven't got anyone there who can actually come out and sell the services to these people."

Rosemary is a calm, unruffled person with many years experience. She is very helpful and self-contained. Her frustration at what she saw as the silliness of the decision to drop flexible working was palpable. Many of the company's business leads in the East of England came through her and she was convinced that business opportunities existed. To her the decision was inexplicable. This was not set up by her as a centre-periphery clash. Ray Costello had been responsible for flexible working practices nationally so, for that part of Digital's business, there was a sense in which Newmarket constituted part of the centre. There was a clear sense from her, however, of parts of senior management being out of touch with the potential of the product.

It is possible that the key decisions taken centrally did not address the detailed opportunities available for flexible working. This is certainly the view implied by Mike Beetham in conversations which were not recorded. Such opportunities did not figure in the response from a manufacturing/technological systems consultancy organization. The orientation of such a company was based around hardware, not soft consultancy services. Flexible working practices were simply not part of the equation.

Furthermore, it can be argued that it is cheaper for the company to buy in expertise in flexible working practices directly from consultants and to move that transaction entirely into the market. Flexible working does not require highly specific assets. Staff can be trained in its use and the technology is readily available. However, given the ambivalence about the precise nature of Digital's market, the company could potentially have enacted a different environment had it decided to do so. The management skills and knowledge of human systems which Ray Costello's group possessed are very difficult to replace. Certainly his colleagues believed this to be true. In these circumstances the company could have become a market leader in flexible working practices by valuing the synergy of its skills in human systems and its competence in providing sophisticated technological solutions. In developing flexible working the company would have changed the nature of its environment and particularly of itself as a company. This decision was not taken.

According to a Digital press release (2nd April 1997) "Digital Equipment Corporation is a world leader in open client-server solutions from personal computing to integrated world-wide information systems. Digital's scaleable Alpha and Intel platforms, storage, networking, software and services, together with industry-focused solutions from business partners, help organizations compete and win in today's global marketplace." Its focus is clearly still on business solutions provided through specific hardware and software.

The decision to drop flexible-working from the product portfolio, whilst incomprehensible to Rosemary Foreman and regretted despairingly by Mike Beetham, can be explained by the way in which the firm interpreted the market and its place within it. The company was defined by the new CEO and by the way it was structured as one focused on hardware. At a strategic level beyond the participatory reach of the Newmarket operation, flexible-working consultancy services were not

of major significance. Market pressures forced these meanings and a harder interpretation of the structures to the surface.

To an outsider this could be interpreted as conventional behaviour under economic pressure. Inside Digital it was not so straightforward and we need to understand further the culture at Digital to understand why this was so.

4.4 The culture at Digital

The way in which the company decided what it should do has been set up here as a debate between different sets of meanings about what it was, or what it should become. The routine adopted for operational organizational purposes at Newmarket was built upon a particular set of staff attitudes and beliefs about the company that was to some extent at odds with the moves taken nationally and internationally with respect to product strategies. The use of teleworking in the company, in the way in which it was set up at Newmarket, as I have shown, matched and mimicked existing routines and the sense of staff that the company was serious about its founding values. This was not incompatible with a simultaneous interpretation of the market that saw teleworking as an inappropriate product, though clearly the Newmarket staff had a different interpretation of market potential and appropriateness.

The company annual report in 1993 claimed the company believed in the core values which made it a great company: integrity, valuing individuals and their diversity, fiscal conservatism, innovation and technical excellence (Digital 1993). As already noted, it had been established by Ken Olsen in the tradition of Quaker businesses. The staff interviewed at Newmarket signed up to these values.

Mike Beetham, for example, in my first meeting with him in early January 1995, described the company's approach to team building in this way:

"In terms of the way we deliver to our customers we will have a project team. The project team [will be].....bringing in the right technical resources, delivering resources, administrative resources and at that level we will have a great deal of flexibility about how the work is centred around those teams. Bringing them in not simply from our own local Professional Service Centre but just looking around, I suppose the UK in most instances, but if necessary we will go off to Europe and bring in expertise from Europe...."

Mike refers to the company as "we". This was common and was used with a regularity which gave a clear message that those interviewed identified themselves

as part of the organization. He describes how he has considerable autonomy as a senior technical expert and how *his* team can look for the best people. (The Professional Service Centre is the Digital term for the local centre to which consultants are attached.)

Even after the blow of the winding up of the flexible working practices team, Mike still expressed a commitment to what he saw as the company's values:

“but let me step back a little bit and say when I joined Digital - which is now coming on for eight years ago - the thing that impressed me about Digital was the way it very clearly cared about people. And I guess what is true is that there was a feeling that if you cared about the people then the business looked after itself. Clearly then, have run through a period recently where it became clear that that had not worked. The business was not looking after itself and there was therefore much more focus on the business. There was never a pull-back, deliberately, in terms of people management. If you look at the statements coming out from the top of the company when Bob Palmer took over Ken Olsen's role one of the first statements he made was to reinforce all the messages from Ken, both in terms of importance of people within the organization and also in terms of the ethics of the organization which, I don't know if you're aware, but Ken Olsen is a Quaker and he was not in this business to make money. You know he made a lot of money, he was a very successful businessman, but in a sense what drove Ken was technology and service to the community, both to the Digital community and also the wider community, the customer community and a lot of Ken's money has gone out to charities rather than to buying himself the latest, biggest, fastest car. He drives around in a ten year old car apparently and things like that.....”

This is an interesting reflection. Mike Beetham is confirming the culture as a caring company. His use of the familiar first name address for Ken Olsen did not come across as an attempt to impress or in an awkward way. He did not see a “pull back” from the initial care but conceded that the approach of allowing the business to look after itself would not work in the changed environment. In other conversations, he was bitter about the treatment of Ray but saw it as a mistaken policy rather than necessarily a shift of company culture, though he did see some shifts occurring in the culture. There is an ambivalence here. The company culture was strongly embedded. The evidence, of which Mike was clearly aware, could be used to demonstrate a shift to a much harder nosed culture but Mike resisted that interpretation.

In the period when the telecentre was becoming established, Ray Costello referred to his own role with a sense of ownership of the project. He shows that ideas from individuals could be incorporated into the business and has an approach to management which is facilitative:

“Going to blow my own trumpet here. I guess, I don't know, it's difficult to say, I'm not sure there were many people who believed in flexible working at the time. I think it happened that I was probably one of the more mobile workers in that sense.....I put forward some ideas, I obviously try as a manager, try to demonstrate some leadership. I was keen to pursue flexible working as one of the options.....”

Mary Bain was more cynical about the company as an employer but her language also adopts an inclusive “we” approach. Here she is, interviewed 2 months after Ray Costello was made redundant, describing the approach to consultancy at Digital:

“.....And I don't think, and I'm not just saying at Digital, I think it's a general, sort of, computer company, all the computer companies moving across to consultancies in this area, I don't believe we're experts to the degree that we need to be out in the market yet. We're not consultant experts like you would put down against a Price Waterhouse or an Andersens yet purely from the, shall we say, the whole consultancy approach bit. We're moving there, we're getting better all the time. As I say not just us, all the people like us that have taken this shift on board and are going for it. But that's how I see it. We're not ruthless enough yet, almost.”

Mary gives a sense of the autonomy and searching for an approach which was shared in different ways by the consultants at Newmarket. Staff took responsibility for their own actions. Such acceptance - in many respects welcoming - of responsibility carried through to the co-ordinator/team leader roles. Susan Wiseman referred to her work using the same kind of language. In the quotation below, she describes the way in which the telecentre was developing in its early period. She shows team-working, the use of “we” again, with a sense of different staff taking actions using their own initiative, alongside a realism about what can be done. The interview took place early in the fieldwork when the telecentre had been open about 6 months:

“I think maybe at the beginning there were teething problems because we weren't following an example, Ray was doing this for the first time, so it was live and going ahead for the first time, we had no book, no guide book, there were no rules to follow, Ray was making up his own rules which worked quite well, but obviously there were issues that came up so if we were going to open a telecentre elsewhere we'd know to deal with these things up front for instance the telephonist/receptionist area, if we opened a fairly large telecentre again rather than putting the phone calls across to someone else we would, suggest now that there is somebody installed who could answer telephones and to do personal duties and perhaps facilities.”

The company culture at this time, in the early months of the telecentre, can be seen to be positive about new ideas. Staff took responsibility and showed initiative. The claims made by the company and quoted earlier that ideas “bubbled up through the entire company” were not entirely rhetorical. There was a belief that flexible working practices could save the company from its financial plight and release staff from the drudgery of commuting. Furthermore the success internally was seen as advantageous in selling such practices through consultancy, where more revenue could be generated, thus creating greater security. The fear that the Newmarket office would close had influenced such attitudes. Ray Costello was seen as a manager who, with others, had saved the jobs of his colleagues, but the interpretations of company attitudes made by staff at that time were more than a sense of relief. There was a cautious, positive approach tinged with uncertainty about the future. There were very positive attitudes to local management but less confidence in the understanding of the Board.

Ray Costello was a champion of the teleworking idea and his enthusiasm was infectious but other staff readily volunteered their own belief in the scheme’s effectiveness. The important point here, however, is the positive culture and the meanings which staff used to make sense of their circumstances, which has to be placed alongside other formative events and structures in tracing through the way in which routines evolved at Digital.

In the early days of the telecentre therefore, it is possible to observe a set of meanings which emphasise opportunity and initiative. As the quotations used in the analysis of the changes to the product portfolio show, staff in Newmarket became less confident about their ability to change things. Both Mike Beetham and Ray Costello, however, retained a view of the company as an organization which cared for its staff as the quotations in this section and the previous section indicate. At the same time, however, they and others interviewed, saw a different but closely related set of meanings being imposed as financial constraints bit more deeply and the company began to focus on a different, and contested, interpretation of its core business.

An element of cultural conflict can be seen. A particular set of practices had been established at Newmarket. This operational routine was built on previous practices in a path dependent way and took for granted a culture which would be supportive of staff and give staff autonomy to manage their own work. Within that framework difficult changes in working practices had been put in place. The national and

international levels of decision-making, however, viewed the company differently: the operational changes at Newmarket saved expense. They were important and helped to provide the opportunity for the company to focus on established, core, product categories.

With such distinctions in meaning and focus it is possible to reconcile the potentially incompatible actions of establishing teleworking as a conventional mode of operating and dropping flexible-working from the company's product portfolio.

4.5 Did technology drive the changes?

Technology partly defined the possible and was also a symbolic part of the company's routines. The use and sale of technologically sophisticated machines is Digital's core business. Internally the relationship between technology, structure and agency had positive feedbacks. Staff and the company knew about technology and used it in complex ways - confirmed by teleworking. It was considered desirable to be at the forefront of such developments. Orlikowski's (1992) analysis using a structuration-theoretical approach maps closely on to the events at Digital. The technology was clearly the outcome of design and development activities and facilitated and constrained human action. The routine of flexible working influenced human interaction with the technology. The institutional properties of Digital then changed as new teleworking practices were incorporated.

All staff were very conversant with technical systems. Ray Costello insisted that technology was enabling not determining as a factor in setting up new working practices, but he spent a high proportion of any explanation of the system describing the technological wizardry which made it possible. The technology was taken for granted as a basic framework, just as the availability of paper and pencils might be viewed in a less technically sophisticated clerical environment. Without it things would not be the same, but all respondents were clear that it was not the technology which had promoted the drive to flexible working. It had permitted it.

On the product side, technology was a basic element and the meanings ascribed to technology were important. Supplying business services was not deeply technological in the sense in which the term was understood at Digital. Service came as a part of a package supporting technologies (seen as artefacts). The approach to business consultancy typical in the consultancy industry, in contrast to the computer-manufacturing industry, was foreign to Digital (and claimed to be

foreign, by Digital staff, to other computer manufacturers). A particular interpretation of technology was recognised at Digital and this fed back into further interpretations of what constituted legitimate activity. Selling soft services touched only the edges of that interpretation.

Thus we can see an analysis of the complex interaction between institutional (and other) structures, human agency *and* technology is required in order to fully comprehend the nature of the events at Digital. But the technology does not exist as a separate entity. It is implicated in and constitutive of the way in which the company is understood, the way in which the staff view themselves and the way in which they define what is and is not possible. Particular interpretations, exemplified by teleworking, view technology as permissive. That interpretation, taken by Ray Costello, for example, fails to recognise how deeply technology was embedded in the history and culture of the company. The technology did “enable” but it was also part of the network of activities which created the opportunities for teleworking in the first place. At Digital, unlike the National Extension College which is analysed in the next chapter, the technology was an unquestioned part of the world and had an intimate part in the recursive relationships between structures and human agents which were instrumental in the changes which took place. The technology was not transformatory, in itself, however. In that sense it did enable change to take place rather than drive the change.

4.6 Summary analysis

A new operational routine - flexible working - was developed and created when:

- The market was changing unfavourably for Digital. Its technical excellence was no longer sufficient to mark it out from the competition and it was over-staffed by industry norms. Thus the company engaged in a search for solutions.
- The new routine was compatible with the firm’s culture about the kind of activities in which it should engage.
- Existing rules and other features of structures were similar or could be mimicked in order to provide a sense of security, identity and continuity.
- Staff suggesting or enacting particular new forms of behaviour were in a position in the company such that they were able to influence the agenda about appropriate responses to changes. This influence came about through actions and working practices which were considered appropriate as well as a result of deliberate argument and persuasion.

- The skills of staff were aligned with the proposed solutions.
- Staff facing changes could identify with the proposed solutions in ways which confirmed their own sense of themselves and the company.
- The changes built upon pre-existing practices.

There was a resistance to change in the company when:

- Activities did not fit with the company's sense of its identity in terms of the market in which it was engaged.
- Well established company practices were incompatible with the new routines.
- Strategic agents were not significantly involved in the development of new products.

Technological excellence underpinned all activities practically - the technological fixes were needed to make the system work - and conceptually as the-way-things-are-done at Digital.

These factors operated simultaneously and acted back on each other and on themselves. Without any one of them it is likely that circumstances would have turned out differently. The East of England operation ultimately had relatively little control over the interpretations of the market place made by the wider company. It was not within their remit. Their successes as teleworkers were recognised but this fed back into the company as a valuable structural change which was financially sound. It matched the company's high-tech, creative culture and was self-reinforcing. At the product level the feedback loops worked in the opposite direction. Consultancy on flexible working required little hardware. It was labour-intensive at a time when the company saw itself as over-staffed. Any single consultancy of this kind generated relatively small revenues and furthermore the consultancy market was occupied by companies operating to different recipes who seemed more experienced and powerful at this kind of thing. Strategically the agents operating at the level of decisions about the company's product mix were not involved in detailed evaluation of the success of flexible working. Their norms were related to large, technically-sophisticated, hardware solutions. In terms of organizational structure in the East of England, and ultimately much wider within the UK operation, there were agents like Ray Costello and Mike Beetham, who operated in ways which changed strategies. Their formal presentations and rule changes, and informal

routine behaviour generated change. In decisions about product mix, taken much further away from local activity, their impact was felt much less strongly.

In trying to understand the changes at Digital it has been necessary to look at the processes of change and the ways in which they inter-related. This has involved a consideration of the factors which were lying behind the surface phenomena.

Underlying structures can be found at a level beyond the firm, that is relating to features of the market. They can also be seen at the level of the firm itself in the relations between the quasi-autonomous Newmarket centre and the larger company within the UK and world-wide and the way in which staff responsibilities and relationships were structured. Management support and the rule requiring managers also to carry out direct revenue earning activities were important structural features, for example, influencing the direction of change at Digital.

Without this particular rule it is possible - indeed likely - that Ray Costello would not have been made redundant. Finally at a structural level, conventional views of the boundaries of the firm were challenged here as people's homes became (again) a legitimate location for work.

The developing routine evolved. It developed partly through mimicking existing structures and relationships whilst changing them in small ways, and in this case, it was largely deliberate mimicking. Rules were suggested and adopted which became habits (Hodgson 1997). The success of teleworking as a process within the firm partly depended upon its previous success as a product, which is an irony and shows how the search for new routines depended upon structures, agents and knowledge already in place. The new routine can be seen as a mutation with some deliberate and less deliberate elements. Other factors (external to Newmarket and the flexible working teams) changed the way in which teleworking was viewed as a product. The change was gradual, finances were tightened, different staff were made redundant. A product strategy *emerged* though in some ways it manifested itself as a quantum jump (Miller and Friesen 1980, Mintzberg and Quinn 1991) when the flexible working team was ultimately wound up. An evolutionary, path dependent approach shows how changes depended upon the structures and practices which were already in place as well as the activities of particular agents. The (partly) chance occurrence of a group of agents skilled in teleworking and the pressures on the company for change resulted in the development of a new routine which has been reproduced elsewhere in the company and survives in the company's practices and memory after the key strategic agents have gone. It is not important whether the teleworking operational routine is defined as new or as an old routine, which has mutated. Drawing such a line is, in the end, arbitrary. What is clear is that the

operational practices evolved through the interaction of different levels of structure, agency and technology which was interpreted through a particular company culture and founded in a particular history.

Chapter 5: The National Extension College, strategic routines.

5.1 Introduction

It is frequently an implicit assumption in organizational analysis that routine behaviour is primarily, if not exclusively, operational. The seminal work of March and Simon, referred to in Chapter 2, is explicit and discusses a continuum which describes behaviour moving from completely routinised to “problem-solving” (March and Simon 1958). This distinction implies a smooth transition from operational to problem-solving and is too stark in arguing that one end of the continuum is routine and the other not-routine. In this chapter the concept of a *strategic* routine will be developed from the observations and interpretations of events at the National Extension College. The implication is not that strategic decisions are automatic but that the range of decisions is limited and that the strategic processes, of searching for better ways of doing things or better things to do, are confined within a narrow band by the strategic routine(s). This argument, therefore, rejects the view that routineness is only an operational feature and claims that there are established and sanctioned practices at strategic levels which are the taken-for-granted way of doing things. Furthermore, the operational routines have implications for strategy so that routine forms of behaviour frequently contain activities which are based in day-to-day operations and at the same time have a direct bearing on strategic decisions. This latter point is taken up in section 5.7, with particular reference to technology, and developed in Chapter 7.

My intention is to concentrate on identifying and analysing the strategic routine adopted at NEC and how it influences and is influenced by both the internal and external worlds of the College. Strategy is about the organization’s relationship with its external environment and is here taken to refer to *the organization’s attempts to shape its internal and external environments so that it is better placed to achieve its objectives or to redefine its objectives*. I will show that strategic routines significantly affect these environments but I argue that the routine is not necessarily deliberative. Taken-for-granted behaviour which is carried out skilfully without meriting comment by the organization has important strategic dimensions.

In addition, one part of understanding the development and reproduction of strategic routines is to consider the extent to which they fit with the behaviour of suppliers, customers and other associates of the company. This idea of strategic fit will also be used to analyse routine patterns at NEC.

The change considered in this research is related to technological developments. A primary research question is to understand the extent to which technological change *drives* other changes or *enables* change to take place whose primary causes lie elsewhere. In searching for suitable fieldwork sites, as set out in Chapter 3, I hoped to be able to study an organization which was *beginning* to use new technologies for the first time on the grounds that if the new technologies make any difference then for new users the potential for change would be high. To find such a fieldwork site rests on a good deal of luck. It is not easy to discover which organizations are *planning* to use new technologies. Organizations either do or do not use them and for the purposes of this research, organizations not involved in the new technologies would then be crossed off the list of potential collaborators.

As described in Chapter 3, the opportunity to use the National Extension College as a fieldwork site occurred by chance. A decision had been made at the College, a few months before the fieldwork began in July 1994, to implement a new information system. The fieldwork took place during the period in which the information system was being introduced and it was possible to look for the ways in which it was implicated in changes at the College.

What follows then is an identification of the strategic routine adopted at NEC, viewed partly through its interaction with the new information system. The argument is that the behaviour of the College, as at the other research sites, can be fully understood only through an analysis of its routines and that the routines themselves, and the factors which operate to reproduce them, are accessible through an interpretation of the actions and discourses of members of the organization.

Background to the College

The National Extension College was the brain child of Michael Young (latterly, Lord Young of Dartington). He announced its establishment in the October 1963 edition of the Advisory Council for Education (ACE) journal, *Where?*, and clearly had in mind a distance-learning organization based around the use of new technologies. It was conceived as a distinctive, radical and optimistic attempt to provide educational opportunities to those who had been denied them. It was a clear fore-runner of the Open University (in which Michael Young also played a part).

Young's original conception was less technologically radical, however. He envisaged fitting a second Cambridge University, offering higher education to working-class and mature students, into the 5 month vacation of the first but, after visiting the Soviet Union and observing the use of correspondence tuition there, he modified his ideas and set up the NEC in 1963 using grant and loan money from a number of charitable foundations and individual contributions. In reviewing the College's first 25 years in 1988, Young said,

"An institution is the way a habit perpetuates itself. That, or something like it, is certainly true of many institutions: they do tend to ossify. They suffer from a hardening of the categories. But the National Extension College is most unusual. It was born by enterprise out of zest, and it has stayed that way throughout all of its 25 years. ... This new era will need more than ever before NEC's gift for flexibility, innovation and openness. ... The ethic is that of public service, even though the means by which this ethic is given expression is non-profit private enterprise." (National Extension College, 1990).

Young's comments give a clear sense of the way in which those interviewed and contributors to the 25th anniversary publication, to which Michael Young's words were the Foreword, view the College. They also indicate the kind of culture that has developed. The title of the anniversary publication, *The National Extension College: A Catalyst for Educational Change*, emphasises also the innovative and flexible approach espoused there. There has been some "hardening of the categories", despite Young's claims, as will be discussed below, but also considerable change, and recently some softening of previously secure categories.

Table 5.1 National Extension College Trust Ltd., Company Financial Profile

(All figures are given in £ sterling except where stated; columns refer to the financial year ending in the month indicated.)

Source: FAME Financial Analysis Made Easy Database.

	12/96	12/95	12/94	12/93	12/92	3 or 5 yr average
Turnover	not available	not available	3,620,094	3,579,430	3,349,848	3,516,457
Profit before Tax	275,510	617,755	388,138	179,457	249,144	342,001
Net Tangible Assets	2,389,302	2,113,792	1,496,037	1,107,899	928,442	1,607,094

Shareholder Funds	2,389,302	2,113,792	1,496,037	1,107,899	928,442	1,607,094
Profit Margin (%)	not available	not available	10.72	5.01	7.44	7.72
% return on Shareholder Funds	11.53	29.22	25.94	16.20	26.83	21.94
% return on Capital Employed	11.53	29.22	25.94	16.20	26.83	21.94
Number of Employees	71	66	51	53	47	50

As Table 5.1 shows, in 1994, when the fieldwork began, the College had a turnover of over £3.5 million with net profit of close to £400 thousand (a profit margin of 10.72%) and it employed over 50 people. It was going through one of its most secure and successful phases. It had not always been so. Despite Michael Young's optimistic words the College has faced regular crises. Its finances have been insecure and its focus imprecise as it moved from one financial opportunity to another. It has retained its underlying mission, of using distance-learning techniques to do its best for students who are educationally under-privileged, and in searching for revenue and financial support and developing new ways of providing educational opportunity, the College has necessarily found itself part of a network of writers, tutors, other educational establishments, broadcasters and others.

Such a style of working goes back to the beginning. An inspection commissioned by the NEC from John Blackie, a retired schools' inspector, in 1970 described a small number of core staff struggling under difficulties and linked to a wide network of tutors and course writers (Blackie 1970). Partnership with Channel 4 and other television companies during the 1980s was a further manifestation of this style of working. Similarly at the end of the 1980s the NEC was the largest single provider of Open College courses. Richard Freeman, the NEC's Educational Director from 1972 and Executive Director from 1976 to 1987, commented in 1983 that such partnership was a strength of the institution. Looking back to its early years he said,

"Here was a college prepared to tackle things which at the time were risky, like training social workers at a distance or teaching people to build radios in their own homes. Yet it had virtually no staff or resources and it could only succeed if it could

persuade other institutions to change. All its major experiments were collaborative - with ITV, with BBC, with WEA and so on. By itself NEC could provide very little but acting as a catalyst, it triggered a major extension to education for adults". (Freeman 1983 quoted in National Extension College 1990).

Currently the NEC continues to exhibit features of this kind. Many staff have worked for and with the college for many years and carry the College's frames of reference with them. New members of staff are recruited from a population familiar with and sympathetic to the College's aims and methods (Interview with College Director, 1994).

The NEC has been subjected to a number of changes during its existence primarily as a result of its need to find funding for its projects. In organizational terms however there appears to have been considerable stability over a relatively long period. It has remained, at heart, an *educational* institution serving a client group who for one reason or another have been educationally disadvantaged. It has been radical in a soft sense of providing courses and materials by relatively innovative methods but has not set out to change the world. Rather it has been pragmatic and opportunistic in finding activities which generate sufficient funds for it to carry on its core business (National Extension College 1990; Interview with College Director 1994, Reports of Internal NEC Reviews 1996).

During the period of the fieldwork the College was undergoing two unusual (to the College) changes. The first was the establishment of the information system. The College had used information technology, broadly defined, during the whole of its existence. The original 1963 conception had emphasised such matters. But this was the first time that a comprehensive approach to information input and retrieval had been attempted and this will be taken up explicitly in section 5.7.

The second unusual change was the retirement of the College Treasurer, Imre Goller. Imre had been Treasurer of the College from 1965, almost from its inception. He is an Hungarian whose command of English strongly reflects his origins. He is admired and held in deep respect by everyone spoken to at the College. As a measure of his influence and the affection in which he is held a photograph of Imre was hung in the College entrance hall, subsequent to his leaving, alongside those of Michael Young and Brian Jackson (the College's influential first Director). No other portraits are displayed in the College. Imre had enormous influence, much of it somewhat idiosyncratic, and took on a wide range of activities, some of which bore

only a distant connection to the conventional work of a treasurer. Imre's retirement had a significant impact upon the behaviour of the College and this will be taken up again below.

Staff directly participating in the research at the NEC

Five NEC staff participated in the research:

Ros Morpeth, the Director of the College. Ros reported to the College trustees and, when the fieldwork began, had worked at NEC in various capacities for 18 years. She had been Director for over 8 years.

Robert Leach was one of four Assistant Directors reporting to Ros Morpeth. He was responsible for educational development and had been at the College for 5 years.

Rita Bond had been at NEC for 18 months. She was a co-ordinator for tutor appointments, supporting, monitoring and recruiting tutors for courses in all areas of the College other than degree and professional programmes.

Steve Ellis was an IT specialist who had worked at NEC for over 2 years. He took day to day responsibility for all IT activities and advised the senior management team on policy issues. Midway through the fieldwork Steve resigned from what was becoming an increasingly managerial role and remained at NEC as an IT consultant.

Alan Broadway took over as IT manager from November 1995, on Steve Ellis' resignation. He was new to the NEC and came to it from a computer dealership. He had previously worked as a Maths teacher. At this time the IT department had grown from Steve Ellis on his own to a unit of 6 people drawn together from other parts of the organization.

5.2 The strategic routine

The NEC's primary strategic routine can be identified as operating through networks and partnerships. That is the way in which things are carried out in dealing with big changes, with suppliers or customers or in internal organizational matters, without thinking about the appropriateness or detail of the approach. The routine is consistent with the opportunistic and pragmatic style of the College (Blackie 1970; Freeman 1983) which, in turn, was partly built upon the need to look for revenue-earning opportunities. Justification for this claim is developed below.

The routine also appears to have a good fit with the College's suppliers and customers. Writers, tutors, training departments, students, educational professionals, for example, find it easy to fit into the structures developed at the College (Interviews with Robert Leach 1995, 1996; Interviews with Ros Morpeth 1994, 1995, 1996,). And the College, in the sense of the collectivity of staff who work there, finds it relatively easy to respond quickly to the demands of suppliers and customers. The College defines its areas of interest partly through its methods of operating. If new business is acquired the routine is modified in subtle ways to meet the demands of the new business but the underlying approach remains rooted in networks and partnerships. Examples are given in subsequent sections.

Below are some examples of the routine in operation.

Ros Morpeth regards the ability to respond to potential partners as one of the College's strengths:

Interviewer: Do you find that you have to respond very fast?

Ros Morpeth: Very, very fast, yes yes. And that is, if we're looking at market strengths I think that is one of NEC's assets. That, I mean we have had, we've worked in partnership with a large number of organizations. I mean we're quite an acceptable partner because we're non-profit making, we're an educational trust so quite a lot of people want to work with us ...

And, partly, this is because the College does not have the resources to fund all its development activities.

"That we know that if we're going to get into that area seriously we'll have to do it with partners 'cos we haven't got the sort of investment capital that you need to go seriously into any multi-media initiative."

There are many potential partners and, as a result, Ros spends much of her time acquiring and developing networks.

"I can't tell you how much time I spend. I suppose I spend at least a part of every day, unless it's blocked out to do something completely different. And it isn't actually very time consuming. But the reason why I do it is because it gives me a basis which helps me make decisions about NEC. ... we get sort of information, and networking as far as I'm concerned is also using knowledge in the public domain as well. It's trying to put bits together to make a wider picture. I mean it definitely helps with decision making, with the working out you know whether a proposal is worth pursuing. I mean if we are approached by an organization, an individual that I've never come across, I will do my very best to find out as much about them as I possibly can, and I will use a network of friends, colleagues, ex-colleagues, people who I've bumped into at a conference, gave me their card, I'll use

it, you know. And also expect people to use me in the same way. I mean you know, I don't, I hope it's not just a one way thing. But I would reciprocate always."

The College Director thus bases her strategic approach around the acquisition and nurturing of networks and partnerships. It gives her the "basis which helps me make decisions about NEC" and she will "reciprocate always".

Other senior staff find themselves operating in similar ways. The College sees itself as a partner and collaborator. Internally similar attitudes are adopted.

Homeworking for staff has been a feature for many years.

Robert Leach: It's slightly complex because some people work on a contract basis in and out of house and some people are freelance but work on a very regular basis with us. In terms of direct sort of full-time staff I think about 7 at the moment, but there is a group of what we call project managers who are out of house to develop new publications and they [inaudible phrase]. They are freelance people, but they work probably at least 50% of their time with NEC projects. And so we consider them very much as part of the organization and try to make them feel involved as much as possible.

Robert's uncertainty about precise numbers and the precise contractual relationship of his staff reflects the way in which individuals are seen at the College. There is no clear sense of core and non-core. Individuals are judged according to unwritten criteria. I sensed, for example, that I was considered to be part of the College network, probably because I worked for the Open University with which the College has a number of formal and informal links, but also because I was seen as potentially a useful member of the network of contacts. This gave me an edge in interviews where I believe I was being given a warts and all account by most participants, in a way that is generally difficult to achieve.

Internally, then, partnership arrangements are seen as appropriate by those involved in strategic decisions. This is not simply a hands-off form of sub-contracting. The free-lance staff are "involved as much as possible" in the organization. NEC uses other free-lance staff in a more arm's length relationship. Such staff are usually sub-contracted by the project managers (who themselves are usually free-lance) and in those cases the concerns of the College are simply to ensure that the finished product is up to standard. However, once members of staff are perceived as partners and colleagues they are treated accordingly. It is difficult to know precisely how this boundary is crossed but once it has been crossed individuals appear to hold

on to that status. For example, though Steve Ellis resigned from his full-time post and worked only as a consultant he was referred to by other participants, and apparently treated, as a full member of the College. His new role was as a “consultant” but his tasks were to deal with a full range of issues which in many institutions would be picked up by staff on permanent contracts. This style of relationship was not worthy of comment at NEC. It was taken for granted.

This strategic routine is embedded in the institution at different levels. The history of the NEC, in both very local terms - its founding fathers (Michael Young) and long-serving staff (Imre Goller) - and in the global terms of the optimistic philosophies of the 1960s from which it sprang, has given the College a strongly held set of ideals through which it views the world. Thus it continues to view itself as an *educational* institution and in 1996-7, for example, *reduced* its prices in order to share its new-found security with its clients. This is a remarkable step to take. The clients thus appear to be seen, at least implicitly, as partners. The “industry” recipe of educational empowerment through a non-profit organization, exemplified also by the Open University and other educational trusts, is consistent with such actions though in the Open University the pressure is to raise fees in order to gain some independence from grant income, rather than to lower them (Open University Council Minutes 1997). In this respect the NEC’s private sector status, forcing it to rely totally on earned income, has required fees and costs to be closely related from the beginning. But the strategic routine is to share throughout the College network, in this example, in a very practical way.

The College thus operates through partnerships and networks in the ways in which it gathers intelligence about its environment and develops relationships with other organizations. The approach to staff relationships has the same broad pattern and the College’s view of its clients or customers is also based on the same kind of activity. Decisions which are taken and processes which are adopted use this style. This is not simply a view of the world, it is about the ways things are done.

No other strategic pattern springs readily from the data. It would be inconceivable, for example, for the Director to make a unilateral or impulsive decision. Broad policy matters are debated. The concept of routine used here does not preclude that. The debates are conducted in staff meetings and with the College’s trustees where the same approaches are reported. The trustees are unpaid and drawn from the College’s networks. (For example one trustee is an educationist who has been among other things a senior HMI, another has headed up the educational

inspectorate and is now Principal of a Cambridge College, a third is an ex-Cabinet Secretary, Cambridge academic and one-time Pro-Chancellor of the Open University, another is the Chair of a national adult education charity, another Director of Continuing Education at Cambridge University.) This is not therefore a surprising outcome. It would be surprising if it were otherwise which indicates the way in which this style of working thoroughly imbues strategic practices at NEC.

Routines are not unchallenged, nor interpreted identically by all those connected with the College, however. We need to consider where the routine comes from and to examine examples where such forms of behaviour are challenged and how those challenges are dealt with. We should start with a review of the culture and its origins.

5.3 The culture of the NEC

A pragmatic and opportunistic approach has been adopted in developing the College's portfolio of projects (National Extension College 1990). The College's history has been characterised by financial insecurity and uncertainty about the projects and courses in which it is involved. NEC has to watch developments in its area of interest closely in order to ensure its survival. Watching the market seems an inappropriate phrase to use in the context of the NEC. The term was used by NEC staff but there was always a sense that there were interests beyond the conventional definition of market. Ros Morpeth was very happy to accept that the College was opportunistic (in the conventional not Williamson sense). Such a term did not misrepresent it:

"No, not at all, no. Extremely opportunistic. And that has come from I mean, I suppose the reality of staff knowing that if we don't bring in enough money their jobs are on the line. And there is a much, sort of, more acute realisation of that in an organization like NEC than there is in the OU."

But the opportunism is tempered with an approach which selects those projects the staff feel comfortable with. There is a level of pragmatism and flexibility in this which is also based on an implicit understanding of what the College can do well and believe in. Ros described the rejection of a potential money-spinner:

"I mean just to give you one concrete example of that, for a number of years we ran a telecomms programme for BT which was, had a BTEC accreditation and it gradually wound down, mainly because of the privatisation of BT and the qualifications were no longer a pre-requisite for promotion at technician level.....Well just very recently we had a meeting with City & Guilds who also had telecomms qualifications and the people from City & Guilds said 'We always

wondered why you stuck with BTEC for those qualifications, as ours are, you know, much bigger, very much faster and it's still one of our fastest growing areas with a tremendous amount of take-up overseas as well, as countries try to get their telecomms sort of expanding around the world' and they said 'Why you don't you go back to Telecom, you know you'll make a lot of money out of it.' And after he'd gone we sat down and talked about it and there is honestly no-one in the organization who is in any way interested in developing a whole new telecomms scheme. We worked with it in the past because we inherited it from BT, who ran the distance learning programme centrally, developed all the materials themselves. When privatisation came they couldn't administer, there was no role, there was no central body who could administer it, so they handed it over to us on a royalty basis. And we all agreed that we'd all worked on that scheme just purely because we had to, and not because anybody had any strong interest or got fascinated by it or anything. And so we just decided there and then that this was an opportunity that was, you know, clearly existed, you know, and under other circumstances would be worth pursuing, but there was not a, sort of, a champion within the organization who would say 'Oh yes go with it. You know, let's really make this all work.' And quite often that's the difference between something going really well and something going at sort of half-cock. It's having at least one or two people in the organization who have got that sort of tremendous drive and energy behind it."

Thus the approach involves an assessment of the potential revenue from any project and the extent to which it will be championed at the College. The need for an individual to take responsibility and drive projects forward is recognised. But projects do not arise only by chance. The culture is opportunistic in picking up things which happen to fall the College's way but the underlying sense of what kinds of activities excite NEC people makes that opportunism partial. Thus the original BT relationship was "inherited" but without a champion to drive it forward, the establishment of a new relationship was not pursued. But the perceived market place is watched carefully so that there is a level of intelligence about what is likely to arise. Ros again:

"Well from, if we look at other distance learning providers, we will many, many times approach them as potential students. You know, members of staff will do that, will get on mailing lists, will, we will analyse the offerings and compare it with what we're offering. And that means that our own customer services team, when they're talking to students, can actually talk to them in a knowledgeable way. With publishers we obviously get the catalogues and compare as well. There's a lot of networks and grapevines. I mean I think one of the interesting phenomena over the last few years has been the number of people who are working on a freelance basis, and are working for a number of organizations in similar fields, and quite often through those sorts of grape-vines we hear that, you know, another organization is planning a competing product to ours. We, I mean one thing I do personally, is I go through all the job ads in the education press, not because I'm personally looking for jobs but quite often it's the first announcement you get that somebody is

planning a particular initiative, or planning to move into a particular sector, because they advertise for staff in that, you know, to set up a new exciting unit to look at the Health Sector or something like that. And I mean within the organization we've all got our antennae out and we pass information around.....”

Here collaboration in “networks and grapevines” and the historical tradition of employing freelance staff figures widely. This comment from Ros Morpeth shows how central such relationships are for her way of working and for the work of many other people at the College.

Internal cultural features

Obligation and reciprocity are important features of the NEC culture. The sense of reciprocity is largely unspoken but shows in many aspects of College life. For example, a ritual which confirms aspects of that kind of meaning is the way in which staff there celebrate birthdays through buying cakes for the rest of the staff. Interestingly, this was drawn to my attention because it had become too extensive. As staff numbers increased cakes were being provided so often and in such quantities that a new convention was agreed, that there would be a day set aside every few weeks when several people would provide the rest of their colleagues with goodies! In itself this was a minor aside used to illustrate the growth in staff at the College, but it illustrates the depth of the culture and helps us to understand the meanings which NEC staff used in interpreting events. The obligation and reciprocation which NEC as an institution operated in almost all its relationships is encapsulated in this small ritual. Such meanings were then carried into taken-for-granted ways of operating at the College.

Alongside the care taken with personal relationships, NEC staff are flexible and used to adopting new methods. Steve Ellis was surprised at the acceptance of e-mail:

“I mean I was surprised when I put it in, it was the second E-mail system that I put in, how widely accepted it was. They'd obviously had some, I've noticed with E-mail systems when you put them in there's a sort of, the first phase is, sort of, novelty value, people send silly messages to each other just for the hell of it, just playing around, but there didn't seem to be that much of that here. People seemed to take it very seriously right from the word go. And I mean, certainly, if I look at the usage on the server it's surprising how many messages people are sending....”

However, surrounding the espoused flexibility and openness is a sense of tradition which can sometimes appear stifling. Imre Goller emerges in the accounts given as a man of enormous influence. His style appears to have possessed almost an authoritarian paternalism. In many ways Michael Young's original conception had been paternalistic - a declaration that elements of the working classes *needed* an experience like Cambridge - and the College's origins in trying to provide an opportunity for people less advantaged carries with it the risk of being paternalistic in the worst sense of controlling and patronising. The College had avoided those pitfalls but the paternalism was obvious. Ros Morpeth spoke on a number of occasions about Imre's notion of the "little people":

"He's got a wonderful sort of turn of phrase and he distinguishes between the little people, who are the freelance people or people who run very small businesses, and the big people, who are British Telecom and Parcel Force and Inland Revenue and people like that. And the cash flow, for instance, he obviously is, you know, ensures that the big people get paid on the last possible date, he doesn't go over but, you know, he holds back the cheques. But the little people he will pay on the dot and it makes an enormous difference, I can tell you."

The enormous difference, according to Ros, was the loyalty shown by the little people to NEC. In general it was claimed that they preferred to work for NEC and would deliver work for NEC ahead of that for other organizations because they were treated well by NEC. They appear to have been drawn in to the NEC network. The paternalistic culture ran right through to staff payment systems where staff might be supported if in difficulty but, until Imre Goller retired, there was no fixed pay day. (Staff were paid monthly but there was no declared date on which this would happen.)

I had a sense of Imre as a strongly paternal figure and this image was not rejected when I suggested it to the interviewees. Indeed several respondents positively confirmed it, referring by explanation to Imre's origins, but it did not appear to be resented or resisted. He was a "fabulous bloke" (Rita Bond). The cultural norms which he personified, including elements of "father knows best", were not entirely consistent with networking, however.

Cultural contrasts

There is an element of contradiction here. Networking brings with it concepts such as open relationships between equals. The services provided within the network are reciprocated. Here we see one party in the network making judgements about

the needs of others in a hierarchical way in which that party believes it knows best. Indeed, one image which came across strongly was that of a *family*. Rita Bond used this image explicitly:

“....it's very much a family here, you know, and I wouldn't want to sort of upset anyone, so I might take steps to find out if other people have comments.....”

and again later on in the conversation:

“I mean, some of it may be because of that. Don't forget it's only a small organization, so it is very much like a family. And there are all the sort of intrigues and nice, you know nice things and bad things about families. You know, petty rivalries and all the, you know, I don't have any problems with that, that is actually although they don't sound as, it sounds as though I'm being critical it's not, I mean that sort of thing makes it good. I feel like that anyway.”

There were thus elements of a dual culture, each with similar features. Care and obligation feature in both stereotypes but one is centred on reciprocal behaviour between equals and the other on a more hierarchical relationship. They are broadly compatible but sometimes work against each other. Thus networking, collaborating and acting in a supportive way fits with positive elements of a family culture as a caring and secure home. At the same time, the controlling and emotionally demanding elements of the same metaphor can produce an over-reliance on some individuals, which they may cultivate, and an unwillingness to adopt new approaches. The paternalism and family image plus the longevity of employment of some staff, produced a resistance to change which sat uneasily alongside the espoused flexibility and pragmatism. Rita tried to change a number of clerical practices and found this difficult:

“I think. This is going to sound negative but it isn't really, but there are lots of things that I would like to change and some things I have tried to change that I've really been blocked, not from the management as we call them, just to be funny, but from people below. And I mean we all know how difficult change is. You know, I mean it can be very disturbing but in, I would say in this organization it is extremely disturbing because of the sort of secure feeling, you know. People are very worried about what will happen. But that's the thing that I find most irritating because whilst, you know, I'm like anyone else, I like things to go on for ever, the fact that you're blocked by people below you to change is the most difficult to deal with. For me.”

Rita is observing a wish for security, for things not changing, and acknowledging a somewhat schizophrenic view of “management as we call them, just to be funny”. The two cultures create such a dual view. Management are equals simply carrying out different jobs, or management are more knowledgeable “elders”. In a formal sense the management are management but in the culture of the NEC, it appears

odd to use that as a general term. The College is a small not-for-profit firm operating within conventional commercial practices, but the cultural style, in some aspects of its work, is more like that of a Cambridge college with responsibilities *in loco parentis*. This style was shifting during the period of the fieldwork and the departure of Imre Goller was important in this respect as is discussed in section 5.6

In the resistance to change however, there had been some “hardening of the categories” despite Michael Young’s earlier claims. Rita talks about being “blocked by people below you” indicating how the culture which valued collaboration could potentially stifle activities.

Steve Ellis also observed resistance to change at an operational level:

“In the main? Yes. As I say it’s better with people who’ve been here for a short length of time. It’s the people who’ve been here for fifteen, twenty years and they don’t see the immediate benefits of change. Having said that, you know, I’m not one for changing systems just for the sake of it, but there certainly are, have been some fairly arcane practices which need to be changed. Yes, at some stage certainly there have been occasions when I think management have actually had to push fairly hard to persuade people to change.”

What we find then, alongside the pragmatism and responsiveness of the organization, is a resistance to change. This is coupled with a view of the College as a close knit set of colleagues who have obligations towards each other and reciprocal relationships which to some extent override the formal contractual relationships. Consultancy and contract staff and the little people are treated with care. Relationships inside and outside matter. But there is a tension between the old Cambridge college paternalism and an egalitarian style of networks and partnerships.

One feature of NEC which reflects the resistance to change just outlined, is the departmental structure which is remarkably persistent for such a small organization. Robert Leach, for example, commented a number of times that he was unable to comment with confidence on a particular point because the topic under discussion did not affect his department and he therefore had limited knowledge of it. The departmental boundaries must therefore be relatively strong. All respondents at some time referred to the departmental structure. It was noticeable to Steve Ellis. His job was to begin the implementation of the new information system and he had to work across departments:

“.... I think there are a number of functions that NEC carries out and needs to carry out, which basically sort of traverse departments, if you like. It doesn't necessarily happen because people sort of very fixed in their own mind about what is required of them and who they're answerable to, et cetera. And they will handle their own particular job whatever, and then they'll pass it over to someone else. And they don't necessarily see the job through to the end. I guess they don't therefore derive as much satisfaction as they might. There's also the danger that things don't go as they should be. Don't run through smoothly. And I slightly worry from time to time as to what the customer or the student actually perceives of us. The fact that somebody gets passed around from department and it takes possibly quite a long time to find the person that they actually need to speak to. And similarly sort of important functions like, you know, enrolling students, collecting invoices, despatching orders, this sort of thing because it is so departmentalised structure, when there are glitches I'm not quite sure who actually picks up on those. Got a horrible feeling at the end of the day it's the customer or the client who actually suffers. They don't realise it until they actually come back to us because there's no-one with this sort of overall view, if you like, of a particular function, seeing it through from start to finish.”

This problem was recognised by all respondents in different ways. Ros Morpeth was keen to catch the market awareness which fell between departments' responsibilities. Rita Bond had very positive comments about attitudes and the company's wish to get things right and saw departments as internally open. She saw real consultation *within* departments as a normal procedure. But working between departments was difficult and unrecognised by several respondents. Robert Leach, for example, even as an Assistant Director, took it for granted that he had very limited knowledge of other areas.

Cultural meanings at NEC are therefore complex and sometimes ambiguous. It is a genuinely caring institution which slips into paternalism. There is an informal, open atmosphere but a strong sense of department. There are a large number of people associated with the College in various ways who are valued for their intelligence about the commercial and educational environment and also valued, using a different sense of the word, as colleagues and people. The treatment of the little people, with the ambiguity of meaning in that phrase, encapsulates the contrasting elements of the culture.

Working in networks and partnerships in general fits comfortably with the culture. Such forms of working depend upon reciprocity and obligation but there are elements of the culture which do not always sit easily with the strategic routine. The tight interpretation of the departmental structure produced a different set of relationships

which could hamper the development of networks and as we shall see the implementation of the information system began to reveal some of the contradictory features here. Similarly the family metaphor, which fits more consistently with a departmental structure in which “family members” get on with their own thing, could be damaging to an open and equal approach to networking.

5.4 Financial imperatives

In addition to the culture a number of other features of the College’s history and environment were implicated in the development and reproduction of the strategic routine. The financial position of the College came up in discussions on many occasions and it is clear the College’s history has been heavily influenced by financial imperatives. To understand thoroughly the College’s culture and routines, it is helpful to reflect on the importance of financial security and insecurity.

Pragmatism and networking have arisen partly from the financial insecurity which has typified the College’s history. The external world has traditionally exerted influence through financial pressure. This has tempered pragmatism and a radical agenda with a cautious conservatism:

Ros: “.... But I think NEC always will be a bit behind in that area, because we haven't got a big, you know, amount of money to invest, you know, we're talking when we're thinking of a new course we're thinking 'Can we afford to spend twenty thousand?' You know it's not, we're not talking about two hundred thousand or half a million or a million or, you know, it's tiny tiny little budgets that we're having to make go an awful long way and as soon as you move in to anything other than ordinary, you know, you're having to talk about a budget that is ten, twenty, a hundred times. You know, we haven't got that sort of money although, you know, we have had a lot of approaches from other organizations who sort of look along our curriculum material and say 'Wow, this has saved us a lot of work,' you know, so there's no shortage of potential partnerships. But I think that if we took a very radical or dramatic approach we would lose...”

Current financial success has allowed more time and opportunity to reflect on strategy. A spate of reviews were carried out at the end of 1995 and the beginning of 1996. And each of them was carried out by someone who already had a relationship with the College drawn from its network. They occurred at that time because of Imre’s departure. (The reviews were not held up *by* Imre. They were not undertaken until he had left because this would have been difficult for him and others. The College’s concern for its staff is exemplified by this.) However, a prime reason for carrying out the reviews of the College (rather than the timing of them)

was increased financial security plus the College's increase in size and a belief that more systematic methods should be employed because of that. The reviews may signal a move to a less opportunistic approach. The replacement of Imre Goller by John Elstub, who adopted more conventional financial planning techniques, had made the institution more secure, according to Robert Leach:

"It's certainly been much easier to access commercial information since his departure. The logic of the ways in which income and expenditure are apportioned is much clearer, easier to follow. So financial planning has become a bit more available, and we've been able to use spreadsheets for the first time to budget projects and see whether, you know, little exposure over three years will justify the investment or not and that's been able to be fed into the overall budgeting system...."

The recent financial success had been important and noted by Alan Broadway, who was the recently-recruited Information Technology Manager.

"No, resourcing is not a problem. Because the way that we're structured - the Open University is the same - but we are a non-profit making organization so any profit, paper profit that we make, has got to be put back into the business, and that's the state that we are in at the moment. We are making a very good surplus and we can't pay shareholders. We've got to put it back, we've got to spend it on something. And, you know, it was expensive to put the link across to the warehouse and another company might not be able to justify that. We actually had the resources to do it, for example. That's just taking one example of quite a costly thing. We could have managed with the old server - another company might have had to manage with the old server - but we have got the surplus to spend on that."

Alan had worked as a teacher and for commercial organizations before joining NEC. His perception was that the College was able to resource most of the things it needed - certainly in the IT area - and this was not something he was used to. It was also new for the College. The first comment in this sub-section from Ros Morpeth was made in November 1995. Alan Broadway's comments were made in August 1996. In that short period there had been a palpable improvement in feelings of financial security. Partly this came from the financial climate but partly it came from the increasing awareness of the financial situation that John Elstub's appointment and the use of financial information, through the new information system, had made possible. In general, the resources were being used for investments in, for example, the IT "link across to the warehouse" or in reducing fees with the intention that all NEC people, including students, should share in the benefits.

Thus the deeply embedded culture and routine practices using partnerships and networks partly arose from a history of financial insecurity. More recently staff

changes and the sharing of information, made possible by the new information system, has enabled staff to manage the new-found financial security more easily. The use made of the new resources has confirmed the College's culture and strengthened its IT base.

5.5 The Physical Environment.

Before moving on to look at the information system and technology more widely, there was a further feature of the College which seemed to play a larger part in routine behaviour than might normally be expected. The College main building has a symbolic significance and is the College's major asset. It is implicated in the reproduction of the strategic routine.

In its early life the College inhabited a number of different temporary buildings, moving from one barely acceptable location to another. Its current home, which it owns, is a delightful Victorian building (de Salvo 1993) about one and a half miles from central Cambridge. Ownership confers security and the attractiveness of the surroundings, much enhanced by the efforts of the current Director, make the building feel more than simply an office block. It is not a convenient building for its current level of occupancy and the needs of high-tech cabling. It feels a little like a large family home. I questioned Ros Morpeth hard on a number of occasions on why the College did not move to surroundings which would be apparently more convenient and more suited to its current needs:

"Well we've obviously talked about it. I mean and it's come up on several occasions. I think that, I mean I don't feel too worried about the pressure on space. Because what I encourage people to do is to say 'OK. Is there another way of getting this done?' I think when people are over-stretched or when, for example, I mean we've just heard that the, that Coca-Cola Schweppes are going to take a second cohort of frontliners who will be starting their degrees next September, so, you know, when we hear a particular programme is going to expand or, you know, we've got, you know, a new sort of spurt of enrolments or something like that the first, sort of, knee-jerk response is 'We need another member of staff.' And the first request is always, I've noticed, for either admin or clerical support. Which is interesting. You know, not, 'Is there a program that we can bring in that will actually cope with this routine work, so we can release existing staff to do more interesting work?' It's 'We need another person to input.' Or, you know, whatever the task that involves, really. And I think it is actually quite a good discipline for NEC to say 'OK well where are you going to put that person?'"

Ros explained that the security provided by owning the building had been a major factor in the continuity of the College in previous financial crises, and she acknowledged, that the thought which had gone into the building's decoration went beyond that normally associated with work-places. To some extent this may simply be one way in which Ros puts her mark on the organization. She has undoubted flair in these matters. But it also confirms the way in which the building helps to confer meaning on the way the organization views itself. The physical environment mirrors the culture and routines of the College.

And Ros agreed, the shape of the organization was being partly determined by the shape of the building. It would be nice to have more space, she felt, but there is a strong reluctance to consider moving from the building. Expansion into neighbouring houses would be welcomed but is impossible. Ways of working were, therefore, partly determined by the physical environment.

There is a sense of location internally too. Robert Leach pointed out that shortage of space created a re-thinking about appropriate groups:

"Yes well there was the idea of creating an IT unit rather than devolving IT functions around the building to different departments and that created a need for the space started in one place, and that made it worth while looking at the way in which we grouped. And I'd already been lucky enough to have all my core editorial staff working with me on the same floor and it's made an enormous difference as far as I'm concerned, they can all work together. And we ended up having a similar approach to each of the floors now. Ros and her team are on the first floor, one half of the first floor has been replaced with another half of the first floor. Roger and his team have the ground floor, so it works very neatly. which wasn't the case before."

Movement of staff to different offices around the building had, as in other organizations, created some dissatisfaction in the staff. Ros tried to ensure that everybody gained something from the move, even if only a redecorated work-space. The move was occasioned by the need to accommodate the new IT department but for some staff seemed to have a more symbolic significance. Rita saw it as a major disruption beyond the needs of the IT arrangements and it may be the case that Ros used the move, non-deliberatively perhaps, in order to "unfreeze" people so that other changes might be made more easily, though she never stated this explicitly.

The lack of space in the building would be a massive constraint if free-lance staff were not used. As has already been discussed, free-lance arrangements suit the

College for other reasons but without a larger building no other option is workable. Decisions about the physical environment thus act back on the organizational structure. The preferred routine of networks and partnerships enables the current building to continue to meet the needs of the College, though not without major challenges for the physical implementation of the information system. The strategic routine allows the College to continue to occupy a building which is, in some senses, too small. And because it is too small, it confirms the validity of the strategic routine.

5.6 The departure of a strategic agent.

A further significant factor in the development and reproduction of routines at NEC was the presence, and departure, of the College Treasurer, Imre Goller. From conversations with all participants, it is clear Imre acted as a strategic agent and his influence has already been referred to on a number of occasions. His influence appears to have been sufficiently substantial to be worth reflecting on in a little more detail in order to uncover the role of agency in the reproduction of routine behaviour.

The opportunities opened up by Imre's retirement were widespread and his retirement became a significant symbol as a watershed in the history and organizational culture of the College. Three months after Imre's departure Ros Morpeth saw it as an important catalyst:

"Well the catalyst was Imre going. Over thirty years. I mean, Imre had taken on a range of responsibilities in the organization that were much more than finance. Yes. And, you know, for example he managed, he set up and managed the print works and the same was true with the warehousing and distribution. And mainly because they were areas he'd taken an interest in. He'd been the person who'd moved NEC away from photocopying through to offset litho printing and he ended up sort of managing two very substantial units, in addition to his finance role."

12 months after Imre's retirement, the opportunities presented by him going were even clearer. In answer to a question about the most important factors driving changes at NEC, Ros saw Imre's departure as very important.

"Well I think that, I think there isn't a single one, but I think an awful lot of those developments had been put on ice until Imre went. Because I mean certainly in the last year of, and he was the person who chose, I mean he chose the point where he wanted to retire. He let us know well in advance, you know, it was actually his birthday, right down to the day when he was going to retire. And, but he was incredibly, sort of, touchy about change in that year. I think there was a sense in which he was very ambivalent about going, he'd given his heart and his soul to the organization. It's

hard then to imagine a time when somebody else is going to be sitting in your desk and doing your job. I think the fact that people then want to start changing is almost a sort of, if you're the sort of person Imre was, he had very little separation between personal and professional sort of life at all, then if people are asking for change then the sort of feeling you get emotionally is that they weren't happy with the way you were doing things before. So we did out of, you know, out of both I suppose tact partly but also because if Imre didn't want you to do something, he'd make sure you didn't do it, and so I don't think people felt that they quite had the energy to take him on. Cos ultimately he signed the cheques, you know. I mean I did too, but I mean, you know, you had to have his signature on the cheque in order to pay somebody for something. So an awful lot was, you know, 'We'll wait until Imre goes before we do this,' and I think that left out a tremendous watershed of things that needed to be done."

Imre was a massive figure in the organization. He had enormous influence in the development of formal and informal rules and routines.

The reviews of the organization and its environment were undertaken subsequent to Imre's departure. These were carried out by consultants connected with, but from outside, the organization and covered an organizational review, a review of quality, and research into the organization's environment intended eventually to feed into a corporate plan. The College did not typically undertake such reviews. These were the first since Blackie's report in 1970, and whilst they were partly motivated by the likelihood of the College seeking some Further Education Funding Council funding, they also reflected the recognition of significant change in the College's environment and in the College itself. For many participants in the research the departure of Imre Goller was the single most important change.

The College had also entered a period of unprecedented financial success and had grown rapidly. Between 1991 and 1994 total employment in the College, reported in the company accounts, varied between 47 and 53. By the middle of 1996 it had grown to over 70 and virtually all that growth had taken place since Imre's retirement in the summer of 1995; an increase in 1 year of 40%.

These changes were only partly a result of Imre's departure but the importance of a key strategic agent, in this case not the chief executive, is well demonstrated by the extent to which his leaving became a watershed. It had a physical and symbolic expression and happened on a particular date. It was easy, therefore, to characterise it as significant and to imbue it with an importance which may be overstated. The other changes, linked in different ways to his departure, in financial

security and to the information system were less dramatic but, in studying the data, probably have a longer-lasting and more fundamental influence. Nevertheless, the College's history does show that individual agents have had significant formative effects.

5.7 The implications of technological change

The new information system (IS) has revealed issues about structures and relationships at NEC and has enabled behaviour to change in ways not hitherto imaginable. For example, Robert Leach's comments, quoted above, show how the accessibility of financial information has enabled strategy to be more readily evaluated. This section examines the extent to which the IS revealed aspects of the strategic routine or revealed links or contradictions between strategic and operational routines. It also considers the way in which technology was implicated in the changing operational routines and how those were linked, if at all, to strategic practices. A substantial electronic information system covering the whole range of the College's work was a new dimension at NEC. The College was still coming to terms with the implications of the system during the fieldwork and the repercussions, inter-connections and changes associated with it were being worked through.

Three elements are particularly noteworthy with respect to the IS and strategic routines. Firstly as noted already, the IS has made it possible to use management information in different ways. Secondly, elements of informing, described below, are apparent through the making explicit of previously tacit knowledge and the use of that knowledge by a wider group. This has challenged some of the taken-for-granted assumptions about appropriate ways of doing things. And thirdly, existing structures have been revealed explicitly enabling questions to be raised about them, for example the virtue of departments keeping themselves independent of each other has been challenged directly by the use of the IS.

Informing and IS implementation

The technology cannot be interpreted independently of the people who work with it (Latour 1996a, 1996b). Different views existed about the value of the new information system and the IT department found itself pulled in different directions. Disagreements were not explicit. They arose as grumbles or comments on how things might be. The IT department was implementing what it interpreted as a technical feature but found it almost impossible, at the beginning, to satisfy

demands. The demands were not for technology but for service. Technology as artefact and technology-in-use were inextricably mixed.

Initially, grumbles were also substantially increased because of problems in the implementation of the IS.

In February 1995 the following conversation took place with Rita Bond:

Interviewer: So in terms of the drudgery, as you might to say, it's the removal of drudgery.

Rita: Except there isn't, you see. I was just going to go on to say that there isn't a removal of drudgery.

Int: There should be.

Rita: Yes.

Int: But it hasn't happened?

Rita: No. And I just don't know. Because the IBM, which was the system I came into here, is so old-fashioned that it's almost laughable. But it did its job. But it couldn't report. You know, it was pathetic really. You know, I mean it was really years out of date. But the whole thing is written round the accounts package. And that's not necessarily what the other departments want. So everything else is almost a refinement of the system, and you have to wait your turn to get it. And it's really pathetic the way that they've sort of transferred information in the same format as it was on the IBM, and in actual fact that was the way, worst way to present information. I just would have gone for a clean sweep if it had been me.

So attempts to maintain continuity between systems, in a sense to mimic the familiar (in the way that was successful for Digital when it introduced teleworking) were not always welcomed particularly when this slowed down activity. Rita, who was relatively new at NEC, would have "gone for a clean sweep". Developing an old accounts package to make things better was "really pathetic". By November 1995, the problems had become potentially very damaging:

Rita: That's why I'm in the state I am today, you know, because everything is a battle. I should be writing a report but how can you be writing a report when you've physically got to, you know, move tutors and students round? It's a real problem for me.

Int: This is almost entirely because of the IT changes?

Rita: Well yes because I used to be able to resign. It's essential if a tutor wants to resign that I can resign them. And that the students are transferred. Well because of something else not working on

the system I can't tell who are inactive and who are working students. It's unbelievable. And so they've not had follow-up letters, they've not been communicated with, we can't call groups of students up to mail them because we don't know who's working and who isn't. I just, I don't really want to tell you anymore 'cos it's just horrendous. And because of all that I can't tell which students are working and so I can only transfer manually students who are actually sending in assignments and do it like that.

Systems problems were thus making life extremely difficult for Rita and she was angry. Her ability to do things had lessened as a result of the current state of the IS and she found this discouraging and, I sensed, a blow to her pride in her ability to do a good job without having to ask for support and help. She continued:

Rita: Well the trouble is no-one, although they're becoming clearer as it develops, but initially the problems started because no-one knew whether the IT department should produce labels, reports or whether the individual should. And there is two schools of thought, I mean thought within the organization about this. There's one school, and I'm being absolutely honest here, so you may never hear this again from anybody, who think that everything should be controlled by the IT department and nobody should be producing things individually. And there's another school who thinks that providing that there's an agreed time for printing out huge reports and huge label runs, which I think we all accept, which may have to be done at the weekend or overnight, then the control should be within the individual, because of course it's taken away a lot of things that should be done by the individual and of course being motivated and you know there's some loss of tasks there for the individual.

There was a lack of control for Rita. Jobs she had carried out before, which had been under her control, were potentially being shifted elsewhere. This reduced her motivation. I interpreted her expressions and manner as a feeling that she was being demeaned. She was always bubbly and lively, and sometimes quite blunt, but underlying that, on this occasion, was tension, uncertainty and a sense that she was being treated badly by the organization. She was becoming, in some respects, an operator of the machine, waiting for it, or others in the organization, to deliver, when she had been used to doing all these things for herself. This is one feature of informatizing (Zuboff 1988). Rita felt threatened by a form of deskilling which took away aspects of work which had previously relied upon her intelligence. There were other features of the shift of control too:

Rita: And also because of the lack of control it, you know, it can create insecurity, can't it? I mean actually in the day to day work because you don't feel in control. Can be a problem. It's certainly a problem for me 'cos I never know what the damn thing's going to do next. That's how I feel about it. I mean I'm the first one I mean I there's no protection passwords, there's nothing. Everybody can

get into every bit of the system which is terrifying. And they do. Because they get in accidentally. I've been all over. And I don't want to go all over. You know, I just want to go into the bits that I need to go into.

Other features of informing are implicated here. "Everybody can get into every bit of the system" so those things which previously resided in Rita's head or on her own (un-networked) database were now available to everyone. "There's no protection passwords". This was "terrifying" and although the reason for the terror was unspecified, it was clear from Rita's manner that she saw problems both in other people messing up her data and the risk that she might inadvertently create problems for others. In addition she was concerned about what precisely she could now regard as hers. These are also potentially empowering by-products of informing but for Rita, at that time, they were not viewed positively. However, they reveal the way in which the new IS was beginning to challenge existing practices and the structural relationships individuals and departments had with each other.

Structural changes and the IS

The example shows how the autonomy of departments was threatened by centralising IT in a new department. Old assumptions of autonomy, such as who can produce labels, and the control which goes with this, created conflicts. Some of the problems arose from poor implementation and training but it also arose from the changed nature of the system. The informing potential and loss of control linked to slowness and poor systems implementation was a major problem for Rita.

But the information system was intended to make information more widely available and to facilitate some of changes which Rita found challenging. Steve Ellis described his concept of the importance of the new systems to NEC:

Steve Ellis: I think basically they're very important because what we tend to do here is mainly administrative work and a lot of it is fairly dreary and routine, and I think electronic systems obviously cut down a lot of the day to day drudgery. Free people off to actually talk, communicate with students and tutors. Which is something we're not very good at doing, I think, partly because people's time is spent doing these more mundane tasks. So I think there is a lot of scope and there has been a lot of scope.

Interviewer: Cut out the drudgery. Is that, do they do more than that?

Steve: They will do I think. I mean again that was something that was always an intention that we should do far more analysis work, provide much more information about our students. Do proper

forecasting, budgeting et cetera. Which is something that the old systems never did. The new systems will be much more capable of doing that.

He went on:

Steve: And also at their desk. The old system there was, sort of, one terminal per room, so you were obviously restricted on who has access to the terminal, who has to actually use the machine. Whereas now people have actually got their desk top. The idea is that they can import data from the [inaudible word] and drop it into any application.

The IS was thus intended to provide access to information for a wide range of staff. But increasing access to information and making information clearer, challenges existing structures in ways which had not been anticipated. At the time of Rita's comments and Steve's explanation (which preceded Rita's experience by six months), the implementation process had not been completed and the system in place was slow. Subsequent upgrades and user support resolved much of Rita's concern. She also absorbed the changes and began to work in different ways. Six months later she said:

"Well I think it was, to talk about the IT. I feel much happier about it. There was quite a lot of meetings and the consultant who used to work for us, Steve Ellis, who's the consultant, [Steve Ellis had resigned by now as a full-time member of staff but continued to take on free-lance consultancy contracts.] he was given 5 - that's the number of days - to make alterations, enhancements and a lot of them have gone through. And I feel more relaxed about it. Sort of can see the end. I still could be, I mean I still could be critical about it, but there's no point in being, it's better just to hope that it's going to get better and better."

Steve's enhancements had dealt with a large number of detailed issues which had been very irritating to Rita and her continued use of the system had reassured her that her initial terror was unjustified. But the enhancements had changed the system too. Steve's ability to adjust the technology-in-use and Rita's increasing confidence meant that both Rita and the technology had changed through the interaction between them. The IS was a tool moulded by human endeavour but it also possessed some features of agency. The technological tool did not possess intentionality. It could not decide to carry out particular functions but its particular form had caused Rita to modify her behaviour in ways in which she would not have done without that specific IS. This is not a determinist argument. The fact of the interaction is illustrative of the way in which both human agents and technology are implicated in social change (Latour 1996b, Jones 1998b).

The IS also focused attention on structural features which had been taken for granted before. The rigidity of the departmental structure was an issue which came to the fore in thinking through the IS. Implicitly the IS challenged previously held notions of autonomy and responsibility. Rita's responses are one example. Ros Morpeth had reflected on such issues and early in the implementation phase made it clear that she was looking for a central IT unit. The then current spread of IT functions in departments was a problem, as she saw it, because the opportunities to gather information received by one department but only of value to another were not being taken. Information of high value to the marketing department may be of no interest to the finance department, but the information arrived on invoices. There was thus a potential for conflict between the two departments with one insisting that it did not have the resources to code all the details it received and the other arguing that such information was vital. Centralising IT would enable such details to be captured. In doing so the skills and knowledge of the different departments would be shared. Information previously held in the memories and filing cabinets of particular staff or groups of staff would be available via the IS. The interpretation and use of that information might change. Informing was thus one objective of the IS, though it was not expressed in that way, and was seen as a pragmatic response to potential changes. Ros Morpeth was anticipating a more flexible structure which would break down departmental barriers. This would bring the internal structure more in line with her perception of the College's external environment. Robert Leach also saw the new IS impacting on the departmental structure.

"I think on the whole change is really straightforward without any sense of shock, at the move from entirely paper based communication to E-mail for example has been extremely smooth and effective. I think a lot of it is finding it difficult to let go of the idea of keeping paper copies of drafts and redrafts and so forth. So we did have a literal sort of spring clean at the beginning of this year when we got rid of a lot of. Committed ourselves to keeping things on disk rather than on paper, and perhaps that was a culture change for some of the people here."

He continued:

"And perhaps move towards a looser management system whereby there are people from different departments [inaudible phrase] We haven't got structures in place that make it informal easily. It does happen in fact already in many ways, but we don't have the system."

Was the IS a causal factor?

Robert saw benefits from the potential of the IS for sharing information - a feature of informing as privately held information enters the public domain - and breaking down boundaries. He was inexperienced in IT matters but had become enthusiastic about them and had enrolled on a number of high level courses dealing with new

approaches to communications technology. Some things were already happening and he hoped that such things might continue and a looser structure may come into place. Robert and Ros, at their more senior level in the institution, were thus trying to create the changes which (unintentionally) caused many of the problems experienced by Rita. Robert saw the IS as one of the *causal* factors in these changes.

Ros Morpeth argued, however, that the potential of information technology was not driving the changes:

Interviewer: How much of the changes were driven by the opportunity for a new IT structure?

Ros Morpeth: Probably that was not the deciding factor. I mean, you know, you could look at the changes in two ways. I mean one is Imre's departure being the catalyst, which it was. The other perspective, which I think certainly other people in the management committee would say to you is that some of the changes were things that we had wanted to do for some time. But there was no way that they could have happened while Imre was still in post. Because he would have resisted very strongly any change to his role at all. Although certainly in the last six months he was starting, you know, to prepare himself to leave. 'Cos I mean while he was in full, sort of, full flow then it would have been very very hard to have restructured. But I mean certainly the IT system has had an impact, but it wouldn't be honest of me to say that that, you know, it was driven by the IT system. And I think we do see the IT system as being a tool, you know, rather than something that we have to, sort of, organise our business around.

The information system may have been seen as a tool but it was clear that trying to maintain old operational routines with the new system would not always work. John Elstub, the new Finance Director, was reported by Ros to have found old and new routines getting in each other's way:

"I think I mean one of the things that John said to me about the accounts package, and he's come in, you know, fairly new, is that he can see now, having been in NEC for, he started in August so, you know, sort of, a bit over three months, that some of the problems and some of the things that the accounts staff complained about with the new Tetra system was because they were trying to do things in the way they always had done. And it was a tremendously complicated feat to make the Tetra software perform in that way. And so, you know, they were finding the system unnecessarily complex."

Attempts to stay with well tried operational routines were thus challenged by the new system. As staff learned about the system, and it was adapted to their needs (as exemplified by Rita's experience) the complexity diminished.

Ros, however, was missing some of the shifts which were occurring in arguing that it was only “a tool”. The interaction of the IS with existing routines was changing the organization of the business. It did this in the way I have set out for individual staff, such as Rita, and it also raised questions, perceived only implicitly before, about the ways in which people carried out their work. In a conversation with Steve Ellis, then an IT consultant, and Alan Broadway, who had just been appointed IT manager it became clear that their perception of their role was as providers of a new tool, but that in doing that awkward questions sometimes came up. Steve commented:

“It’s interesting that having computerised some areas that weren’t previously computerised and has actually identified these problems”

(The problems were of many sorts, such as the inability to incorporate data in certain ways, or that particular individuals did not know about data which had implications for their work.) Alan made a similar comment:

“That’s right, but we’re doing something which is perhaps beyond our brief here, we’re identifying inefficient systems within the company.”

He continued a moment later,

“That’s definitely true. Yes. I mean I’ve noticed that since I’ve been here. I’ve had to not just solve problems, existing problems, but think of new ways of doing things and if the IT unit couldn’t do them then they wouldn’t happen.”

Alan did not specify an example at this stage in the conversation. He was surprised that he had become entangled in what were, in some cases, issues of policy and he seemed uncertain about his role. At this time he saw himself as a technical consultant and was reluctant to move beyond that area in answering questions. Steve was happy to roam much wider. On subsequent visits, Alan had more thoroughly absorbed the NEC culture and he was prepared to treat me as an insider and to express his opinions more readily. It is clear that the IS was not a neutral factor in changing routine behaviour however. From the interviews, staff believed that its existence enabled things to happen which had not been possible previously. Its existence also raised questions which had not previously seemed significant or about which people had been unaware. Whilst the IS itself was not driving change it was clear that both recursively and discursively change was taking place which would not have happened without the IS. Such changes did not relate only to technological solutions. The technology was implicated in changes in social systems.

The changes taking place were directly affecting operational routines and questioning existing practices. The internal culture was shifting slowly and some challenging questions were beginning to arise. For example, one specific feature which was mentioned towards the end of the IS implementation period was the fact that Ros Morpeth did not use a computer. This fact had no relevance earlier and its implications both practically and symbolically for the College simply did not exist. But now that the IS was beginning to play a bigger role, such matters became noteworthy. It was revealed to me by chance in a discussion with Rita Bond:

Rita Bond: Ros doesn't have it, you know. Ros doesn't have a PC.

Interviewer: So she doesn't get E-mail?

Rita: Well we have to send it to Alison or Maureen. Or print it out! I don't send an E-mail to Ros 'cos I can't bear that idea. Some days I think I want her job without a PC and a keyboard. It's interesting, it's very interesting that she should be the Director and be in that position in this day and age. I mean it is interesting.

The fact that the Director did not use a computer and was not therefore able to stay in close touch with what was becoming a major communications and information network in the College raised questions about the nature of communication and the perception at a senior level of the value of IT for strategic relationships internally and the importance of IT for the College in building networks and partnerships outside. It could potentially be an important symbol. It also raised questions about the direct experience she could call upon in assessing the implications of the IS. I raised this with Ros.

Interviewer: You don't have E-mail?

Ros Morpeth: No.

Int: Why not?

Ros: Well. I mean I've never ever used a computer.

Int: [Very short inaudible comment]

Ros: I know, I know. No I will and what I'm going to do next year is get a little laptop. It goes back to when I was about 16, I think, and I was thinking about what I was going to do with my life and my career. My father said something that I never forgot. And it's actually proved me in good stead. And he said "Never learn to type. Because you'll always be put into a secretarial role." And I mean what I should have done was learn to type and not tell anybody I could type. And so, and I think there are some things in life, they, I mean, they take on an importance beyond, I'm sure, what the person who gave you that bit of advice ever meant. And I never ever used a keyboard. Except on a calculator or something like that.

I asked her if the lack of e-mail didn't make her feel uncomfortable and that perhaps she was signalling something about her preparedness to be part of the organizational culture. She replied:

Ros: I don't feel uncomfortable. I mean, you know, I have decided that I will and that, you know, I'll do so early next year. But I mean, I suppose it may reflect a feeling that it can become very, very, sort of, time wasting.

Int: Oh, it can.

Ros: And I mean of the things that I am terribly short of is time. You know, and I have to struggle quite hard to, you know, sort of cut away the inessentials and just to concentrate on the essential things. And, you know, I suppose the thought of coming in on a Monday morning and finding there's 30 or 40 E-mail messages, I don't know. You know. I suppose I think if somebody really wants to communicate with me they'll put their head round the door or they'll telephone or they'll send an E-mail through [inaudible word], they'll send an E-mail to Alison and all, what have you. And I don't particularly want to get involved with the banter. Maybe I'm arrogant, I don't know, you know. I mean, I suppose I don't want to sit and have to respond to 30 E-mail messages before I even start the day.

The decision to acquire a modern electronic information system had thus begun to influence, or at least question, the routine behaviour of the College's senior manager. The College had changed not just because work done previously could now be carried out in a different way but because the nature of work and relationships were changing through the possibilities opened up by the IS. Modifications in social systems then created new legitimate uses for the IS thus modifying the possibilities for the technology (in-use). If Ros Morpeth did not develop her IT skills this would give messages to the College about what was and was not appropriate. If she did develop them, similarly, the appropriateness of different kinds of behaviour would be redefined and different possibilities would be created.

In discussion with other members of staff, Ros Morpeth's lack of computing skills did not appear to be very significant, nor is she backward in considering the possibilities of the new technologies. She does not however, see the institution of a much bigger IT function having a profound effect on the way the organization operates:

"The IT unit is a unit that services, in the same way that the accounts department does, you know. It provides a service to the organization, print comes into the same category, and it doesn't, on its

own, drive the organization. But at the same time from a management point of view the, you know, there is a need to make sure that we're using IT in the most strategic way. But I mean I still feel that that is to support the work of the organization. Because, you know, we're not an IT company."

It may be that Ros Morpeth develops IT skills and becomes involved with changes that transform the NEC. As a key agent in the College her attitude towards IT practically and conceptually will be influential. During the fieldwork there was no evidence that Ros Morpeth hindered the implementation of an IS strategy, however it was only towards the close of the fieldwork that her attitude, practically, to the use of computing became worthy of comment.

Her comment above, however, does not accurately reflect what was happening in the College. The IT department is not the same as the accounts department. The IS enabled different forms of communication to take place, for information to be shared in different ways, which challenged existing taken-for-granted assumptions, and raised questions which had previously been implicit or unrecognised. An accounts system can do some of these things. It can certainly raise questions and challenge assumptions but the accounts system is a report about relationships, it is not part of those relationships. In contrast, the IS meant that human agency and the (computing) network changed through interaction with each other.

The information system was not causal therefore in a technologically determinist sense. But as a factor in changing operational routines such as those carried out by Rita Bond, and in challenging the internal structure it has been implicated in changes which have potentially wider dimensions. Ros Morpeth's initially limited connection to the system has been challenged and could presage major changes in the way she operates internally and externally. The decision to purchase, develop and implement an information system was itself strategic insofar as it was intended to enable the College to interact more effectively with its students and clients by, for example, picking up key information, but the IS was seen as a means to allow information to flow and be shared better internally and to enable better co-ordination of primarily operational functions to take place. Those changes were very nearly in place when the fieldwork finished and what seemed clear was that developments would not finish there. The shifts in structures and practices were likely to bring changes to the College at all levels as each acted back on the other. At that stage the new information system had not been *directly* implicated in the strategic, networks and partnerships routine but in making some features of the College explicit, it enabled

challenges to be made about appropriate behaviour, some of which had potentially strategic significance.

5.8 Networking again

Networking had different meanings at different times and in different places in NEC. In interpreting the interviews, at least three uses can be found as the quotations given throughout illustrate. A common use of the term by senior staff and the IT department was the network of computers within the College, with occasional references to outside computer networks. A second usage was by senior staff to refer to the range of different kinds of staff who work with the College. Partnership was also used in this context. The third usage was primarily by Ros Morpeth and referred to the broad range of contacts and “grapevines” to which the College was linked in different ways. Partnership was also used here to refer to some of these links. Alongside the latter two usages, the notions of obligation and reciprocity were also implied and sometimes explicit. The term was not conventionally used for internal staff relations. There the departmental structure and family or paternalistic culture appeared more appropriate. The staff were part of a wider network and sometimes formed partnerships externally but did not appear to see themselves as a small internal network.

In my initial analysis I assumed the first usage - a computer network - could not be useful in assessing the College’s strategic routines since it is a specialised computing term. That remains a consideration but the fact of that network and its potential for compatibility with the strategic routine provide valuable contrasts. In practice the availability of the computing network and its associated opportunities for sharing information was an important factor in revealing some of the tensions between the desire for an open internal network espoused by Ros Morpeth and Robert Leach, in particular, and the difficulties this created for more junior staff, in particular Rita Bond, but also in comments from Steve Ellis. The network of computers fits well with the strategic routine but in doing so raises explicitly some of the differences between that way of working and the other “family” or paternalistic model. In sharing information via the network and in having access to information previously held by others we saw evidence of stress and tension. The network and the agents involved then interacted and the tensions were reduced. At that time the computer network external to the College was largely unexplored.

Thus the informing potential of the IS at NEC was implicated in changing operational routines and some interactions with the IS uncovered cultural conflicts

which showed that the strategic routine based in partnerships and networks did not operate in the same way throughout the organization. The contrast between network and family is an interesting one. Network implies equality and the use of a computer network can also carry this implication. Family can imply control and computer networks can also be used to control. The departmental structure comes from a paternalistic, *in loco parentis*, Cambridge college culture and was resistant to some of the implications of network. The second two usages of network set out earlier are part of the strategic routine as identified here but they are not entirely compatible with the family metaphor.

The term "family" was volunteered only by Rita Bond. Other participants broadly approved of it when I offered it to them but I sensed a more ready acceptance of it from less senior staff. In their actions, however, there seemed to be some ambivalence. Ros Morpeth reflected on her care for the building and agreed that it was in some ways an extension of her home, though kept very much separate. She told an anecdote about an early decision she took to buy a washing machine to launder towels rather than spend a sizeable sum on a towel service, partly because of her eye for detail and her wish to watch the budget - but in a particular way:

"I suppose I'm quite keen to get, I mean good value for money as well. But it is, I suppose it's a bit like Margaret Thatcher, sort of, talking about the budget as being, you know, like the household budget or something and the fact that you can't spend more than you've got in income coming in and, you know, putting it into those terms. Maybe I do just very practically think in those sorts of terms."

None of these things are significant in themselves but taken together show that the culture which has been characterised here as a family or paternalistic one, one in which big people look out for little people, retains some influence in the College. Staff appear to operate in both cultures in different proportions and with different emphasis.

The use of an information system is revealing some of the tensions involved in the different metaphors. The IS is implicated in changes at different levels but the changes can only be effectively analysed by looking at the information and social systems together.

5.9 Summary

The NEC case shows that routine behaviour exists at strategic levels. Not all strategic behaviour is routine but the strategic practices adopted at the College confined its range of strategic behaviour to a relatively narrow band of options. In Nelson and Winter's terms the networking strategic routine was involved in search primarily in the external environment.

Strategy was defined in section 5.1 as relating to the organization's relationship with its external environment, specifically the organization's attempts to shape its internal and external environments so that it is better placed to achieve its objectives or to redefine its objectives. The institution of the new information system at the NEC was strategic in that sense. It was adopted in an attempt to shape the internal environment so that it (the internal environment) was better placed to meet the College's objectives. There is thus a link between the operational changes which were associated with the IS and the strategy of the College.

In tracing through the strategic routine here and the practices which were related to the IS a tension can be seen between the contrasting cultural orientations at NEC of networks and associated egalitarian relationships, and family and some relatively hierarchical relationships. All respondents appeared to adopt aspects of each cultural approach at some time but there was an espoused desire from senior managers to see the networking culture adopted more thoroughly in internal relationships, a sense in which they wished to bring external and internal practices into alignment, though they did not set it out in this way. Partly by design, but more extensively through the practices associated with the IS implementation, the opportunities for networking internally increased and the structural, cultural and routine blockages to internal networks were increasingly challenged. The connection between operational and strategic routines is thus illustrated.

The culture has been described as opportunistic, pragmatic and flexible and built upon obligation and reciprocity, and also, but still demanding obligation and reciprocity, stiflingly traditional, paternalistic, hierarchical and resistant to change. The practices which arose from that culture, the College's history and financial imperatives faced by the College were developed by strong individuals. They were reproduced partly through the constraints of the College's building which itself was symbolic of the meanings through which College members defined themselves and their activities.

Technology was partly constitutive of the practices adopted. It did not imbue every aspect of the College's work as at Digital, but despite the claims to the contrary of Ros Morpeth and the professed functions of the IT staff, the challenges to taken-for-granted practices associated with the new information system did change the environment in some unintended ways. The organization's key competencies of providing distance learning courses in student-centred, accessible ways are not linked to technology directly, though they do appear to be enhanced by technology. There was a tension which was fought out over implicit taken-for-granted ways of working rather than explicitly. Both Rita Bond's and Ros Morpeth's relationships with the technology are exemplary in this respect. Judgements which define the technology solely as a tool do not take into account the ways in which the technologies and the human agents interact with each other.

There are thus particular established, significant and sanctioned practices within the organization which predispose it to act in certain ways strategically, namely to seek out partnerships and use carefully developed networks. The organization *tends* to act in that way. The practices are not absolute, unbending patterns. The networking and collaborative style which is celebrated by the culture feeds through the organization's structures and the actions of its agents into behaviour which is identifiably the "NEC way". In order to understand strategic behaviour it is necessary to understand this NEC way of doing things. As with Digital the recursive relationship between structures and agents confirms the practices and modifies them. The practices are subjected to discursive assessments but only within a sense of the appropriate ways to act and react.

Chapter 6: Unipalm-Pipex, change as routine.

6.1 Introduction

Interviewer: Well OK, what hasn't changed? What's the same, or what's identifiably Unipalm that was here two three years ago and is still here?

Paul Rivers: To give you a rather devious and nasty answer what hasn't changed is our ability to change everything at the turn of a hat, at the drop of a hat.

The answer to my question given by Paul Rivers, a senior manager at Unipalm-Pipex, encapsulates the view of the company from most, if not all, of the people connected with it. Unipalm-Pipex was an extra-ordinary company. It was involved in the formative development of a new industry. The changes it underwent were large, and sometimes appeared dramatic. If Paul Rivers is right and the company had an ability "to change everything.....at the drop of a hat" can this be considered a routine which the company had acquired or learned or was the company simply forced to change because of the turbulent environment it faced? How did the company acquire the competencies to change everything, if it did, and how was technology implicated in this change? These are the questions which this chapter will address. In doing so we shall be able to analyse the ways in which culture, routine and change are connected.

The concept of routine as an established and sanctioned practice is not normally associated with change. There is a sense in conventional usage that routine and change are opposites. However, the argument here will be that change and routine are compatible and that the explanatory value of routine is enhanced by expanding its meaning to incorporate change. The concept of routine will be stretched - tested almost to destruction - in evaluating whether Unipalm-Pipex should be viewed as being tossed about in an environment of significant change or as an organization which developed ways of incorporating change into its taken-for-granted behaviour.

This chapter builds on Chapters 4 and 5. It takes the distinction between operational and strategic routines as read and develops the concept of strategic routine to examine whether taken-for-granted practices at a strategic level can take into account rapid change. Is it possible for companies to develop, or acquire, strategic routines which enable them to cope with and, potentially, benefit from change or are routines, by their nature, unhelpful in novel circumstances? As before there will be a focus on the way in which technology is implicated in the explanation.

Background to the company

Unipalm was established in 1986 as a software distribution company. It was based upon an approach to networked computing which argued that systems should be open, that is essentially accessible to different kinds of computer. The company acquired distribution rights to system software which permitted openness. Specifically Unipalm became a distributor for TCP/IP (Transmission Control Protocol/Internet Protocol) which is a means of transporting computer data over virtually any medium. Peter Dawe, the company founder, and, his partner, Bob Williams, acquired the distribution franchise for FTP Software Inc., an American software company which produced TCP/IP software. This was to prove a highly profitable acquisition. In 1986 computer networking was developing but was small scale in comparison with the huge growth which has occurred subsequently. During the early 1990s the demand for network software became enormous. Unipalm's link with FTP gave it the ability to provide the software for which everyone seemed to be asking. It was able to generate cash and to support other developments on the basis of the FTP franchise. In the mid 1990s network software became much more readily available. Microsoft's "Windows 95", for example, gave it away apparently free of charge as part of the bundle of services included in the basic product, but by then Unipalm had changed its product strategy and was no longer dependent on distributing TCP/IP.

As well as TCP/IP Unipalm provided other software products primarily linked in a broad way to computer networking. For example another product was "X Window", which is a system of displaying information simultaneously on several different computer screens and which is based on UNIX systems. At the time of its formation, the company deliberately developed a series of connected businesses, with different brand names, which were planned eventually to spin off and become independent. The businesses were all linked to the basic Unipalm distribution business but had separate identities. The *Computer College* was set up as a training company, specialising in Unipalm's products; *XTech* was responsible for developing and distributing electronic mail systems and *Unipalm Consultants* provided technical support and consultancy for customers. The customer base was corporate. At that time Unipalm did not aim to meet the needs of single computer users or the domestic market.

In 1991 it became clear that the 5 partners then running the company had different ideas about the way the company should develop. Peter Dawe, in particular, was

unsettled and asked the other partners to buy him out. He left the company, with no resources at that stage, and began to develop ideas for providing internet connections. At this time the company had around 30 employees. The other directors made no financial offer. Dawe had a significant investment in Unipalm and was finding it very difficult to obtain the support financially or commercially which he needed to develop his new ideas. The lack of an offer from his previous partners meant he could not financially realise his investment. Bob Williams was subsequently asked to leave the company by the 3 remaining partners. After much internal squabbling between the directors, in December 1991 Williams and Dawe bought out the other Unipalm directors using funding from 3i and their joint 51% ownership of Unipalm. Williams took on the responsibility for directing the existing Unipalm distribution company and Dawe used the base provided by the distribution business to develop a new internet connection business within the Unipalm group. The internet connection business was called *Pipex* (The Public Internet Protocol EXchange) Ltd..

The distribution business continued to be very profitable and provided the resources necessary to develop Pipex. Pipex was not profitable but was growing extraordinarily fast, after a slow start. The internet had become fashionable and available to a general market, from its original restricted links as a network for the American military and as an international network for academic institutions. Dawe's aim was to become leader of the new market just appearing. In March 1994 the Unipalm group was floated on the stock exchange. Although the Unipalm distribution business was still the primary source of funding, the presentations to city financiers were made entirely on the basis of the growth potential of internet connections.

A shift was occurring in company philosophy, though the desirability of particular outcomes was a source of considerable argument within the company. Dawe's view was that it was no longer sensible to split the company up into separate businesses and a task force was set up to consider the proposal. This will be discussed in more detail later in the chapter. By the end of 1994 it was seen by some that a single company focused around products related to the internet was an appropriate direction and a primary task became the merging of what were then seen as the two major sides of the company: Unipalm (including the other related businesses) and Pipex.

The cultures of the two sides were different and the processes they had developed for their routine behaviour were different. Unipalm was managed by Williams and Pipex by Dawe. Whilst Unipalm was the primary income-earner at this stage, Pipex was more aggressive and saw itself as the future of the company. In July 1995 the company changed its trading name to Unipalm-Pipex.

The merging of the two teams involved different cultures, structures, routines and agents. The merger took place in a turbulent environment in which new products were developing rapidly and in which consumer preferences were immature. Competition was international. The environment was dependent upon policies of major companies such as BT and decisions about telecommunications strategies being taken by national and international governments. A number of large and small companies were supplying related products but there was no easily identifiable market place (Cronin, 1994).

Unipalm-Pipex was a profitable company. The Unipalm side of the company was in many respects a cash cow supporting the growth of Pipex. Pipex itself had not made profits, though its share price had risen dramatically, but it was claimed that large profits would be generated once the company's rate of growth slowed and it was able to realise a return from its investment in infrastructure.

The company's annual report in 1995 described the relative positions:

"Following a decision taken in 1993, the Group floated on the London Stock Exchange in 1994. The purpose of this flotation was to raise additional funds to expand the operations of The Public I.P. Exchange Limited (Pipex), an Internet Services Provider. During the financial year under review the Group traded as two principal operations, Unipalm Limited (Unipalm) whose activities include the sale of networking software and related services, and Pipex which provided Internet services. The Group achieved record turnover of £17.687 million up 64%. Profit before tax rose 63% to £442,000. Unipalm's turnover rose 49% to £13.928 million with pre tax profits rising 214% to £1.530 million. Its products include a range of networking software products based on the TCP/IP protocol together with training, consulting and internal security "firewall" products. Pipex's turnover continued to grow at a rate of approximately 10% a month rising 263% to £3.759 million. Losses in the period rose to £1.088 million.

Losses are being incurred because of the implementation of the strategy outlined at the time of flotation to grow the business as rapidly as possible. Whilst the rate of growth of new customers is increasing, Pipex is loss making because of expenditure on infrastructure (people, equipment and network capacity) ahead of customer orders. At any point in time, the removal from the cost base of excess capacity, sales and marketing personnel and installation personnel would result in a profitable subscription based business.”

(Unipalm Group 1995)

Table 6.1 Unipalm Group PLC., Company Financial Profile

(All figures are given in thousands of £ except where stated; columns refer to the financial year ending in the month indicated.)

Source: FAME Financial Analysis Made Easy Database

	12/96	12/95 8 months	04/95	04/94	04/93	5 yr average
Turnover	31,853	14,085	17,687	10,753	8,390	17,479
Profit before Tax	-2,141	-8,414	442	272	605	-1,976
Net Tangible Assets	-4,223	1,551	7,173	5,956	1,256	2,342
Shareholder Funds	-5,737	-1,399	6,541	6,179	970	1,310
Profit Margin (%)	-6.72	-59.74	2.50	2.53	7.21	-10.84
% return on Shareholder Funds	37.32	902.14	6.76	4.40	62.37	202.6
% return on Capital Employed	51.43	-813.73	6.06	4.16	48.17	-140.79
Number of Employees	333	223	159	97	97	182

In the autumn of 1995 Unipalm-Pipex merged with an American internet connection company, UUnet. UUnet had a profile in the United States which was similar to that of Unipalm-Pipex in the UK. Both companies were looking for an international

presence. Unipalm-Pipex became the European division of UUnet (and changed its name to UUnet-Pipex). UUnet Technologies Inc., together with Unipalm and its related entities, became one of the world's leading providers of a range of Internet access options, applications, security products, and consulting services. UUnet's network had points of presence throughout the United States and in Canada, Europe and the Asia-Pacific region, as well as connections to internet service providers around the world.

In April 1996 UUnet announced a merger agreement with a major US telecommunications provider MFS. The merger created one of the world's largest business communications companies, providing a single source for a full range of internet, voice, data and video services over an advanced international fibre network. The combined company was then the only internet service provider to own or control fibre optic local loop, inter-city and undersea facilities in the US, UK, France and Germany. The ownership (by MFS) of the fibre optic cabling was a major feature of the merger. All other internet service providers at that time bought "band-width" from telecommunications companies, for example over 40% of UUnet's network expenses were for local communications services (UUnet/MFS press release, April 1996). Significant savings were claimed from the merger, and at the same time the combined marketing teams of UUnet and MFS were able to sell their inter-related product range, thus taking advantage of economies of scope. Furthermore, UUnet (and initially, Unipalm-Pipex in Europe) had a strategic relationship with Microsoft for the development, operation and maintenance of a large-scale, high-speed, dial-up network, which was the primary internet network infrastructure for Microsoft, (including The Microsoft Network which is part of "Windows 95"). Microsoft had a 13% equity position in UUnet and a Microsoft representative sat on UUnet's Board of Directors.

With UUnet's strong position as an Internet Service Provider and MFS's international high-bandwidth network platform, plus the support of Microsoft, the combined company was well positioned to benefit from the shift to internet-based communications. This is the world of *big* business and is a long way from the original 1986 development of Unipalm in a small lock-up building in a village in rural Cambridgeshire.

In the Spring of 1996 Peter Dawe resigned as Director, European Operations UUnet-Pipex, retaining personal assets of £38 million. He planned to follow up interests in politics and invested in a consortium bidding for a local radio franchise.

(Subsequent to the completion of the fieldwork, UUnet became a subsidiary of WorldCom, the world's largest Internet Service provider. It operated in over 50 countries and in the Autumn of 1997 was the company which stopped BT achieving its world ambitions through its take-over of the US telecoms company MCI (see, for example, Barrie et al, 1997). There is a nice irony here. Peter Dawe had often professed that Unipalm-Pipex could potentially be wiped out by BT but that BT had been unable to get its act together.)

Staff directly participating in the research at Unipalm-Pipex

Five Unipalm-Pipex staff participated in the research:

Peter Dawe, one of the founders of Unipalm and ultimately Managing Director of Unipalm-Pipex plc.

Bill Thompson, a Cambridge engineering graduate who had been involved in network developments as a teacher and consultant for over 10 years. Bill Thompson originally moved to Unipalm to help set up the Computer College subsidiary but moved into what was effectively a personal assistant role to Peter Dawe.

Thompson then took part in the public presentation and public relations activities of the company. He resigned from Unipalm in August 1995 to take up a post as an IT journalist but continued to take part in the fieldwork as a knowledgeable "outsider".

Paul Rivers joined Unipalm in 1993 as Head of Technical Services. He came from a big company technology background, having previously worked for Digital and ICL, one of few people at Unipalm to have such experience. At the end of the fieldwork he was the only participant still with the company and had become Head of Dial-up Services, UUnet-Pipex.

Rob White had worked for Unipalm for 5 years when the fieldwork began. He was responsible, through a team leader, to the Head of Sales for major corporate accounts. He left the company in the late summer of 1995, partly because of dissatisfaction with changes at Unipalm, to work for a company offering similar products.

Sarah Broker joined Unipalm in 1991. It was her first job. She worked first in purchasing and then in Unipalm sales, ultimately becoming a sales executive for the combined Unipalm-Pipex company. In 1996 she left to join the armed forces.

6.2 Change as routine

Section 6.1 has set out the changes experienced at Unipalm-Pipex. Some of that change was directly its own creation such as the implications of the merger of Unipalm and Pipex, some arose from its own behaviour in the external environment and an extended example of that, considering the company's move into the individual dial-up market, will be developed in this section. Some arose from the turbulence of the environment in which it operated.

The company culture was aggressive and fast-moving. How did the company cope with change? Change was ubiquitous and therefore routine in the sense of a normal feature of the company's world. But was the company able to develop its own routines to cope with that ubiquity? Clearly Unipalm and Pipex were different. Whilst Unipalm faced frequent changes in software specifications and a rapidly growing market, its environment possessed regularities. The distribution business had created established, significant and sanctioned practices using formal and informally-developed relationships as well as technologically driven processes via its databases. Much of the day-to-day operations at Unipalm were straightforward. Relatively well-developed scripts had been created both in terms of the approach to customers and suppliers and to internal operations. There was a sales "bible" of frequently asked questions and tips and clues about products, as well as a database (which changed during the period under study) and which was a crucial site of operational routines, on which business was followed through. The distribution business had been awarded BS5750 for its procedures in dealing with customers. Within this there was a consistency in the way the employees were allowed autonomy in developing their relationships with customers or suppliers. The payments system (with bonuses based on targets and margins earned for sales) was a "controlling" device and the database defined many operational routines (Interview with Bill Thompson 1995). The world of Unipalm had an operational regularity about it.

Pipex, on the other hand, still saw itself as a mission, driving hard with few holds barred.

Technological interconnections and operational routines

Without the new network technologies there would have been no Unipalm. The exploitation of those technologies was its *raison d'être*. Dawe was driven by a desire to be an industry leader. But a focus on technology also drove many day to

day activities, so that staff, whilst apparently autonomous, had relatively little room for manoeuvre. Informing (Zuboff 1988) was widely apparent at operational levels. Unipalm had used relatively sophisticated databases for most of its history. These databases enabled staff to manage their work in an information-rich environment. The database provided them with an enormous amount of detail about transactions they and others were undertaking. The information was public to the company and constrained the manner in which activities took place. Autonomy was thus severely circumscribed. The precise manner in which an activity took place was under the control of the staff member but the basic task was highly routinised:

Rob White: But over the last three years we have migrated away from that into electronic systems. For example, when I joined Unipalm five years ago the bought leads were done by paper. You'd have a stack of leads on your desk, you'd work through them one at a time, whereas now it's all on the computer screen. You click on the next screen, it brings up the information, you call them, you put the new information in, click on the next one. So that's all on-line.

The database was a commercial piece of software, called Unitrac, which had been bought in to the company. Sarah Broker found it "brilliant":

"Yes, yes. The most important thing for me as internal sales person is Unitrac, which is a data-base of the customers which you are probably, it's every customer that sales have ever approached or has ever approached Unipalm. And I mean it must be tremendous now. And you can go in there and you can amend details on it, so if this customer rings you back next week you could click on their name, and all the information that you've spoken to them about, which you've actually put in there, is there. So for a sales person that is a brilliant system."

Not all routines were directly linked to the software but the approach adopted was heavily influenced by the tracking systems possible in the software. Eventually help pages for staff were built into the system itself though initially they were kept more conventionally. Procedures were not laid down in detail but the electronic system effectively controlled the options and, on the sales side, standard customer relations procedures were in place.

Rob White: There's no procedures laid down for us. We have several levels that support us. We have what we call the lead generation unit. Who don't actually generate leads themselves, they take the leads from marketing and do a sort of first line call to check that the details, check what the person's really after. They have knowledge of the actual products, but they know the right questions to ask and in their case there is a script. You know the sort of 'Good morning,' whatever, 'How are you today?' whatever 'Did you get the information?' all this sort of thing. Now that's a very straightforward script which probably takes one to two minutes to complete, and from that they then decide what sort of opportunity is available....

Sarah Broker: No, we're not given a script or anything. We're told, we've got like a sales bible which has been made up for us which has got every single product in. It says questions and answers if you like, most people ask this question, through a survey or people have gone to the certain product people have said 'God this man keeps asking me this question and I never know what the answer is, even though I've asked a thousand times.' So we have got this sales bible which has been made up of questions and answers which when a new product's brought on board that is what happens. But we aren't actually given a script and said 'Right, if anyone phones up you ask them this, this and this.' But we are told roughly what we need to know, what we need to ask....

Unitrac was not the first database Unipalm had used. Previous systems had been subject to problems and senior management had experienced difficulty in getting this kind of system accepted. The difficulty arose, according to the staff interviewed, from the unreliability or slowness of the system not the principle of using such an approach. The introduction of Unitrac had not been free of bugs but its facilities were much appreciated as the quotations above indicate. The use of such a system gave Unipalm effectively a very clear set of operational routines. They were not written down in a conventional way. The routine was built into the software in the sense that the screens and information available in the software acted as an agenda and resource base for staff. Unipalm's memory of what had been done and how its activities were carried out, at a practical level, were also, in that sense, embodied in the software.

Informating creates the opportunity for control structures via the transparency of the activities at operational levels. That is to say, it is possible for everyone to see what is going on. In general control was not explicitly exercised at Unipalm. It was unnecessary to create formal control structures because the electronic system revealed enough without that. Sales targets and bonuses were tightly structured which was an effective control at that level but the potential for control using the technological equivalent of Bentham's Panopticon (Zuboff 1988) was not taken. However, the technology in some respects drove the detail of people's lives and was the dominant force in the strategic vision of the company. In terms of relationships within the company, the things spoken about and difficulties perceived, however, technology was barely mentioned. It was taken for granted. For a company at the raciest end of the high-tech business this was not a problem. Staff expected, indeed wished, it to be that way, as Paul Rivers made clear:

Interviewer: I get the impression that you develop the systems, you're pleased with the systems too, by the sounds of it, but nobody sat down and said "Do we really need this kind of system, should we go back to pencil and paper?"

Paul Rivers: I think everyone in the company recognises that would be a retrograde step.

Int: So in a sense it was on.

Paul: We're all technocrats, so you can't really expect me to say that kind of thing.

Int: Sure, sure.

Paul: Were we a firm of accountants it may of course be an entirely different thing. But we are proponents of technology, and therefore we have a PC on your desk. It depends on the sort of person you are. It's almost a foregone conclusion that unless we use the systems that we sell, unless we exploit the technology, how can we possibly believe in it wholeheartedly?

Paul Rivers was moving beyond the importance of the technology as a valuable tool to a recognition that technology formed part of the way Unipalm staff defined themselves and the company. The culture he was invoking, involving definitions of self, "We're all technocrats", and the company, "we are proponents of technology", went beyond operational routines and identified the meanings which lay behind routines at operational and strategic levels.

Strategic practices

The different cultures at Unipalm and Pipex manifested themselves in the taken-for-granted practices of the company. To give a sense of how this worked, and to gain an insight into routine strategic practices, in Unipalm-Pipex requires a story-telling approach which does more than give the thought-through interpretations of the researcher. The company lived change. Its style and responsiveness is part of the research evidence. In this section I would like to begin by describing events as they appeared to me during one set of visits to the company. Those events encapsulate the culture and routines of Unipalm-Pipex. Van Maanen (1988) would call this an impressionist tale.

The meetings took place in July 1995. I visited the company on consecutive days. On the first day I had meetings with Peter Dawe and Sarah Broker, on the second day with Bill Thompson, Rob White and Paul Rivers. The company was expanding fast. It had doubled its number of employees since my previous visit at the end of January. A new building was being opened in a nearby location and the merging of the distribution company with Pipex was underway.

The company's offices were on the Science Park in Cambridge. This is a prestigious location and the architecture is modern with high-tech design predominant. In general the buildings are low-rise with car parks and small gardens dividing them. There is an atmosphere of modernity, advanced technology and youth. It was a very hot day. The grass outside was scorched and everybody was working in shirt sleeves in the air conditioned building. Peter came down to meet me in reception and took me upstairs. The building was busy. People's desks were pushed up against each other. Peter's room was a glass partitioned office in one corner of a larger room covering perhaps half the first floor area of the building. The room was relatively small, big enough for a desk and table and a few chairs. Nobody else in that area had a room. It was completely open plan. Peter could see, and be seen by, the people working all around him.

Peter was welcoming and very open. He seemed even more full of energy than usual. He spoke using phrases and short sentences, as if paragraphs were unnecessary or old-fashioned. This style of speaking was adopted by many of the people I spoke to at Unipalm, particularly men, and could well be an industry affectation. (It was not adopted at DEC but DEC was in many respects in a different business with its focus on hardware and associated consultancy.) It gave a slightly macho, urgent and knowing edge to any conversation.

I began by asking what had happened since I last visited the company. Peter explained that Bob Williams had gone and that he, Peter, was now Managing Director of the whole group. This had been something of a watershed. The group had switched its focus away from products to particular market sectors. The conversation moved to the difficulties of managing these changes. Peter's manner remained relaxed but with lots of nervous energy. He seemed to want to talk about the issues concerning him. He had split up the Pipex sales team the previous week and integrated it on a sectoral basis with the Unipalm team. He used the meeting with me as an opportunity to get things off his chest.

Peter: Well basically I pretty much forced the issues with them. And where there were missed decisions I faced them. Had them in my room, talked to them about it, and say "Well. What have you yet to do?" Rather than say "OK, this is what you must do." On a couple of occasions I have had to just tell them. You know, "You've got to do this." And there was an occasion, couple of days ago, about a week ago, a sales manager rang. The integration, the splitting of the Pipex team was the issue and basically I lost patience with the softly, softly approach. It had been six months and they hadn't integrated properly and so I lost patience and said "I'm a Director. Do it." The Director

of Sales was really upset about it on the day. Cut the legs off him. "Completely eroded my authority" and then sort of after a couple of days he confessed "I should have done that, shouldn't I?" It was time to grasp the nettle, he'd had an unwillingness to grasp the nettle so he is learning that these tough decisions have to be grasped, and take risks, and understand that it's down to him. But, you know, occasionally you have to do directive management, I had to do directive management.

Peter had claimed previously that he wanted to delegate more. Going over the head of the Director of Sales irritated him. He did not want to do that, he claimed, but was forced into it. But this was not good practice:

Peter: Yes. I should have talked through that before I put it down to his managers, I'm sure. But it was one of those things that, sort of, one of my little. I occasionally get into a mood, which I call Action Man, and it's awful in that I tear up all the rule books and just kind of do things. You know. Unfortunately when I'm in that mode I don't actually think about it. I've thought about what the actions that need doing. OK, I've got frustrated that they haven't happened, right. When I go into Action Man mode I don't, I say "Well that's got to happen, damn the consequences, what's the quickest way of doing it?" OK? I don't think about, OK I'm going to do this but at least tell the manager first, sort of stuff. And it trips me up occasionally.

Int: But you're learning too?

Peter: Well, I wish I was learning but. I know I shouldn't do it but when I'm in Action Man mode I still do it. Grrrrrrrrrrrr.

This was an extraordinary meeting. Peter had met me several times and saw me in some respects as a confidant. He seemed to find the process of being interviewed relaxing and status-enhancing. He was literally acting out his "Action Man mode", growling and expressing his frustration at his colleagues for not integrating and at himself for dealing with them in a way he regretted. The atmosphere felt electric. I wanted to hear more about his sense of how he should behave and how he did behave:

Int: As the company grows, of course, it's going to become more of a problem for you, I suspect.

Peter: I get more frustrated at things going on. There are times when I think "Well, what do you have to do?" And that can be important little things. I have to complain OK. Network show, big stand, good position and as it happened I went there at the opening of the show. And I looked at the stand and the only words on it were Unipalm-Pipex. Now that was the biggest sin on the stand. You should have your product, you should have [inaudible word] on your stand, with the signage. There was nothing at all. I hit the roof. That was particularly galling because when we discussed the stand I know I said "I don't care what the stand looked like, I don't care what it costs, but I

want Internet in six foot high letters." And I want people to see, when they go walking in and ask "I want to do internet, there it is." And they didn't do it. And I also found out that the Head of Sales and Marketing had said the same thing, yet they'd still not done it. And there are occasions when I think "What the. I get really frustrated. And I get doubly frustrated because I shouldn't be doing that. That is well below my horizon, or should be. And uses up so much energy. And occasionally I lose confidence in our success. You know "What can I do?" But I do. When I see something like that I get such a big stick.

Int: You said last time you were, found it quite difficult to delegate and that you felt that you maybe had a reputation for not delegating, even though you try very hard to delegate and believed that you delegated.

Peter: I try desperately to delegate. But my impatience and what have you gets in the way of it. I think. I keep on telling people "Don't come and ask me what to do. Tell me what you want to do." Get affirmation, but they don't seem to believe me all the time. It continually gets better. I go on about the company but it continually gets better.

Peter had now relaxed. The tension had drained out of him and he started to stand back a little from the specific things which frustrated him:

Peter: Fundamentally we have to reinvent the company every six months, changes in market place and so on, changing size, what have you. All but a bit of it is changing. Well a bit of it changes all the time. And quite often people think that. We're a relatively open company and we're open in our thought processes, and so we've got this awful rumour mill going. If you ask a question the rumour mill makes it policy. So, you know, you say what if we turn the air conditioning up? All of a sudden, you know, sort of, the place is going to get a freezer. Or you get complaints for saying that we're already cold enough. Don't, you know, that sort of silliness and that's really quite rife. If we could get some of the positive messages of the company around the company as fast as some of the rumours, you know, it would be amazing. And, of course, if I ask a question it's definitely policy. You know it doesn't confine to me

But. If I could get rid of some of the downsides of Action Man mode but OK you want to do something, you talk to a manager first. That's all I've got to do, and Action Man - to get through some red tape, if you like - that's what you have to do, you have to occasionally you just have to change gear and push through, OK. And it's, it is not the wrong thing to do, it's just that my character makes it that, it's more painful than it should be. I shouldn't be Action Man all the time, 'cos then I would be doing everyone's job. And you've got to allow people, got to allow people to make mistakes. It's this thing, you don't allow, can't allow people to make mistakes on an ongoing basis.....

This conversation gives a sense of change, the way it was managed and the way in which it manifested itself at Unipalm-Pipex in a manner which a simple description

could not. Change was occurring continuously in the company. A routine of sorts was evolving - a hard-driven style with little self reflection. The rate of change was uncomfortable and the ability to live with discomfort was an important part of routine behaviour for all members of staff during the period of the research. An aggressive and rapid response focusing on the main strategic agent is in many respects an absence of a developed routine. It is simply a working through - almost a caricature - of an entrepreneurial style.

But the Pipex side of the company had begun to adopt a pattern of behaviour which also had energetic and aggressive characteristics. The integration of the aggressive Pipex team with the more structured distribution team created problems. The meanings understood by Unipalm staff did not match those of Pipex even though Pipex had only a relatively short history, and staff had been employed for a relatively short time. A mythology surrounded Pipex, partly because of its newness, and partly because it had been instrumental in the creation of a completely new industry. However, at Unipalm there was a belief that Pipex was in many senses simply another product - not an evangelical operation nor an inexplicably complex piece of technology. Rob White, a senior sales executive with Unipalm, described how the Sales Director of Pipex made decisions about the sales portfolio without consultation and how Pipex sales staff worked in competition with their colleagues from Unipalm:

".... but at the same time to dump the traditional money spinners before you have to, I think is really dumb. Mark's [then Sales Director of Pipex] really looking hard at saying 'Maybe we should just scrap all that software.' You know the stuff on there's fourteen million last year. You know 'Let's dump this three million.' He's saying 'Well maybe we should pre-empt the market dive and just dump the stuff.' This is making five hundred thousand pounds a month gross margin and they're talking about dumping it. People are still buying the stuff. You know, 'Microsoft will wipe us out in August.' What we've got to realise is that the cost of the product is actually a tiny fraction of the cost of ownership, and Microsoft are giving it away free next month with Windows '95, but that won't stop people buying it. You ain't going to kill this sort of size market overnight 'cos one player intervenes. And so to admit defeat before you've got involved in a battle is stupid. I mean we dropped three products last week. Sales team weren't consulted, just drop them. Now they were like integral parts of some solutions we were building at the moment. Fifty grand's worth of business. That sort of decision's I think is critical. I believe in the future we'll be into solutions but we can't dump all that stuff yet."

The merger brought a number of the implicit features of the different cultures more out in to the open. The Pipex approach was beginning to infiltrate the whole

company. Rob had decided to leave the company and described how friction over the merger partly prompted his move:

“There's been like a massive amount of friction. I mean that's one of the reasons I'm going is that I got fed up with the friction. they're supposed to work with us to sell Pipex. Fair enough. So what they've done instead is they've not worked with us, they're trying to put something in. They've been selling products They've become head to head with us price wise, you know, quote against us, you know the sort of things they should never have been involved in in a million years. They were doing it and we were aware of, you know, situations where the customer said ‘Oh such and such was talking about that product as well.’ ‘Is he really? Did you ask him if he was account manager?’ ‘He said he was the account manager, definitely said he was the account manager for me.’ And then you know you sort of ask these people, ‘You been doing any dealings with such and such?’ ‘No.’ Interesting. You know. but at the same time you've got to try and work with them, so what do you do? Go and tell your boss ‘Oh by the way, such and such is lying to us.’ I mean you just run with it and accept the fact that if he does sell anything into that account you'll get paid for it anyway. So it's all seems to be the same arc, same little sector so you know what do you do about it? Do you get his boss to come down on him like a ton of bricks and therefore lose him as agent or do you say don't do it again? Well it's a debatable situation and I don't know who orchestrated this method

These were heartfelt comments from an experienced member of staff who left the company partly as a result of the friction arising in the merger of the two businesses. The aggression of Pipex and its approach that almost anything goes, sat uneasily with the more ordered approach of Unipalm. The decisions to “dump all that stuff” were taken by managers originally in the Pipex side of the company who had little sympathy for the traditional selling patterns of the distribution business. For them the future lay elsewhere: an internet angle had to be included in every deal. And they brought the aggressive approach, which had been successful in establishing Pipex in the external world, into their relationships within the company.

This was the beginning of a routine at Pipex which felt so uncomfortable to those accustomed to the more conventional approaches of Unipalm. It was recognised as the way Pipex did things. They coped with change by moving fast and hard, pushing objections out of the way. It was not a legitimated routine, arrived at through debate or notions of appropriate social practices in the way in which collaboration and networking had developed at the National Extension College, partly because it was seen as a necessary evil rather than a socially desirable set of behaviours, but it was clearly the way Pipex staff tended to behave.

The evolution of a strategic routine

What we have here is a strategic routine which has a number of components. Firstly, it is important to remember that the extra-ordinary behaviour described by Rob White and Peter Dawe was built on secure operational routines developed in the Unipalm side of the company. Secondly the strategic practices which are developing appear to have two parts which reach back into the day-to-day practices of the company's employees. The first part is the arrogant and aggressive behaviour which "cuts the legs off" the Sales Director or, when carried out by the Sales Director of Pipex, destroys the solutions being developed by Unipalm sales executives. This behaviour is not simply the action of one person. It was performed, in the examples quoted here, by Dawe, the Sales Director of Pipex and the Pipex sales staff.

The second, and more important part, is the activity underlying this behaviour. Staff are leaping into new areas, almost as an act of faith, and dropping old products. There is a constant concentration on new ideas and new products to the detriment of older areas. This underlying activity need not necessarily, in principle, be associated with the particular, aggressive, behavioural traits, though at Unipalm-Pipex it did appear to be. The leaps are based on rapid judgements about future potential. In the short history of Pipex such judgements had paid off thus reinforcing the legitimacy of what, on the face of it, was sometimes abominable behaviour.

The third component of the strategic routine is the privileging of one part of the company over another. This had been apparent at least from the flotation of the company, described in section 6.1. Action man and product selection were derived partly from this. They drew from the culture and relationships in the company established by Dawe and in some respects reflected his personality.

I sensed that part of Dawe's agenda in his conversations was to establish himself in his own mind, and mine, as a successful manager and entrepreneur. He was not confident even though everything about him oozed self-confidence at a surface level. Revealingly, in an interview after he had left the company, he stated that Unipalm-Pipex could now never be seen as failing because it had disappeared as a separate unit, and that he had come out of it with his reputation largely intact. These were his reflections on success - a fear of failure rather than pleasure in success. An article in *The Guardian Online* also reported him in this light under the headline, "UK net loses pioneer":

"Pipex, the main provider of Internet access to UK businesses and a growing force in the dial-up world, last week found itself without its founder, the man who shaped the UK Internet scene for the past five years.

Peter Dawe, 43, resigned as European manager for Pipex, Dawe says his reason for leaving is quite simple. "The business of being an ISP terrified me", he says. "And eventually the sheer terror palls." He had grown "uncomfortable about managing such a large business" and decided to get out." (*The Guardian*, 23rd May 1996)

This matches an attitude which has been observed elsewhere. Andy Grove, the co-founder of Intel and Bill Gates, who founded Microsoft, have little in common except that, allegedly, they are professionally paranoid. Grove maintains that only the paranoid survive (Schofield 1996). Fear of failure is consistent with the emerging Unipalm-Pipex routine.

The modem story

So far I have focused on internal relationships in the company. The company's strategic routine also drove change externally. The company continually tried to keep ahead of its rivals and in some cases changed the perception of the external world about the nature of the internet business. In the same set of interviews in which Peter Dawe described his Action Man mode, Paul Rivers showed the tension for him of creating a completely new business.

Paul Rivers was a senior technical manager. He had wide experience in the computing industry. On the day following the conversation with Peter, I met Paul in an animated state. He was wearing overalls instead of his usual suit. Paul always struck me as someone who was concerned about his appearance and his clothes were usually fashionable so this was a surprise. The weather remained exceptionally hot and he looked uncomfortable. The company was expanding into a second building. He had been instructed to arrange major changes to the cabling that had been put into the building. Paul was quite literally getting his hands dirty. The new building was to be used for Dial, the Unipalm-Pipex product which brought the internet into the domestic and single user market and was a brand new area of work for the company. Paul had been given responsibility for Dial a few weeks earlier. Paul's manner was urgent and abbreviated, rather like Peter's. In my notes of the meeting, I described Paul as a personification - almost a caricature - of the

company culture. I asked him why the company had moved so fast into the single user market when six months earlier they had claimed no interest in it. I have set out the transcript of that part of the conversation below. Again it gives a sense of what the company felt like and adds to the conversation with Peter Dawe.

Rivers describes the process of moving into the single user market with the Dial product (initially called Solo) in an intense, riveting way:

Paul Rivers: we've got the software product. We've got the demand, got the market place and it was very clear to us with our visibility in the market the demand was going to come. We've talked so far about the differences in dealing with the corporate market place and the mass market, so on and so forth. We've always been geared up to handle the corporate market place. We're not geared up to handling the mass market, so we had to gear ourselves up pretty quickly, 'cos the volume of enquiries that we've seen were going to create a lot of noise and a lot of distraction and a lot of irritation for us. And a term that I've used on a number of occasions is you know if we were going to be dragged kicking and screaming into that market place whether we liked it or not, then we could either do it under our own control or we could do it out of control. And so we had to turn our attention to it and react fast.....

Interviewer: When, when things come in to the company it sounds, from what you're saying, that the response, the standard Unipalm response is yes or no and we'll do it by tomorrow. And that's exciting. What would you say, what's the underlying motive, is there an underlying motive? Is Unipalm, is it going for profit, is it going for growth? Has it got a mix of things. Why?

Paul: Today it's going for a mix of things, but at the end of the day the Internet market's growing very very fast. We have 80% of that market place today in UK corporate connections market and if you extrapolate the growth, the projected growth in the market place and what we're planning to do we will actually lose market share by growing as fast as we possibly can. So there's more business out there, enough there for everyone. But we don't want to lose out too much. We've really got to strive as hard as we can to keep pace with that. Couple that with the fact that, yes, we can sell what it is we have today, usually what we have today isn't what we're going to be selling tomorrow. An opportunity comes along. Experience has told us that if it's not something we've done before we still need to look at it very very carefully, because another two or three will be along in no time at all.....

Int: Do you feel that if you didn't grow so fast and keep up that you might be swamped and just disappear? Is that the sort of threat? It's either keep up or disappear? I guess it is exciting.

Paul: It's frustrating, it's exciting, it's annoying, it's irritating, it provides you with adrenaline, it becomes the reason why you get out of bed, it becomes the reason why you couldn't sleep when you were in your bed, it becomes all encompassing.

Int: I was going to ask how specific changes in technology might have affected this and I guess you in a way you've answered that. You're basically trying to keep up with whatever's going on in the technologies.

Paul: Yes and one of the problems is in trying to move forward many areas of technology whilst still addressing the growth and the new opportunities that clients are throwing at us with the solution to creative takes an awful lot of skill and an awful lot of time. Having anyone left who can pick the phone up and say "Yes Mr Customer, I'll sell you one of those today" is hard work. 'Cos everyone's ricocheting off the walls.

Int: So in a way, I'm not trying to put words into your mouth but just thinking aloud really, in a way the structure of the company is almost defined by the fact that it's in this particular technological area?

Paul: Yes, very much so. I mean the demands of the clients are actually creating this Dial, corporate and international split. And it's quite conceivable that the Dial piece may actually split into two. I can see that, personally, in the future as well, not too far away. Maybe before we've got the whole team built. You have to be prepared to flex the structure of the company, flex your plan for the structure of the company, in response to the demands that you see.

This is growth and change generated by the external world. There were new opportunities, which were hard work, and future changes in the offing. "You [had] to be prepared to flex the structure of the company" to respond fast to change. But it seemed to me that Paul wanted to be seen as an important, go-getting manager, as a big shot. Perhaps some of this drama was his fantasy. I wanted some examples of why "everyone's ricocheting off the walls". His answer set out a dramatic change.

Int: What typically would be the sort of notice that you have of something like that? I mean let's think about Dial. I mean when as you say when we were here last speaking, Unipalm wasn't in that market at all. That was different. now it's a third, at least a third of your structure if not a third of your business. Talk me through how fast that happened, what, how come, you know, six months you've suddenly taken on this main new area. What?

Paul: We produced a product at the tail end of last year called Pipex Solo, which was, as its name would imply, a single user dial up connection to the Internet. The intention was, bearing in mind that we were almost entirely in Pipex area, and I wasn't involved at all in Pipex at that time, not at all. I mean Pipex was those guys downstairs in inverted commas. Maybe not quite that step but you understand what I'm saying, my day to day activities it was outside my field of vision. But it was intended to be used in the corporate market place for two reasons. One is as a taster for the key decision makers who we were trying to influence, who couldn't even spell Internet but they'd heard of it but didn't really "My IT guy tells me that we want this. Convince me." And the other was for those people that had taken the corporate connections to use for tele-working. Now that addresses

two nice areas in the market place. One as a hook for those people to take on the eleven thousand pound a year connection and the other into tele-working, very much an area of interest. So we produced this product called Pipex Solo. Suddenly it looks very appealing to everyone from the key decision maker in British Gas at board level right down to little Jimmy in his bedroom with his Amstrad PC and a modem and his mum and dad haven't got a clue what he's doing, but he's certainly on the net, sending E-mail to his girlfriend, OK? And that product, by accident rather than design, fitted those roles perfectly. Nothing else like it on the market place, time was right, the market was right. Part of the marketing machinery meant that PC Answers magazine caught onto this and put a cover disc on their magazine and it hosed our network. We were in the middle of some upgrades, so we weren't too worried about the extent of that and fairly shortly after we did one for the Internet magazine, a cover disc, and again it just destroyed our network through sheer volume of demand. So then that was the point at which we said "Look we're getting lots of these enquiries, we're getting dragged into this, we've got a product, it's here now, we need network infrastructure, we either disappear into complete and utter chaos saying 'We can't cope with this' or we put our minds against it and we say 'We can cope with this by doing this, this and this.'"

Rather like Peter the previous day, Paul was animated. He was describing actions taken by the company more or less to test the water which "hosed our network". The network staff and the marketing and sales people were screaming. How would the company react? What would the routine response be? The company had taken a small step and suddenly found itself in a new world. What could it do? Paul continued:

"Part of that was Peter's command. His command from on high to me "Paul do this." And I built the network. On the day that he gave me that I had no idea what to do. Didn't know what the technology involved was, what the modem racks looked like, what bits and pieces I'd need, what Lego bricks I'd need to put in place. Where the suppliers were, how it all fitted together, what space we had. We didn't have space to put it anywhere. Just knock a few walls down, move a few things around and it all comes together. But, you know, Peter and I put our minds round it and we came up with an attitude of mind that said "We can do it. The only things that'll stop us are things that'll get in our way so we move them out the way."

Paul: Well I mean it was a problem. It was a problem, it was impacting the network and we took a decision that says "Right. We go for this market place." The marketing people were saying "Look. We've got this cover disk but there's another half dozen that want to do it. The opportunity's there." There's a lot of sales people saying to us "Well, resellers want to resell this product. It's really nice, it's caught the interest. You've got the makings of a business there. You've got a market that demands a product. You've got a product that's there and deliverable. All you need is a network and a structure of people to be able to address it. All the key elements, the basic building blocks for a successful business were there. All you've got to do is resource it.

There was then a brief discussion about the main competitor for Dial, a company called Demon, and Paul continued with his explanation of the Unipalm-Pipex *volte-face*:

Paul: And there seems to be a steady migration of Demon users to us. If that stops then maybe that's one of the danger signs. I don't know.

Int: Why, why do you think that's happening? I don't know anything about either product so.

Paul: It's the capacity of their network. And we've invested a lot of money. I spent two million pounds, since you and I last spoke, on deploying this. Two million pounds that we didn't intend to spend back in January. Brave decisions! And we have enough modems to ensure, and enough intelligent call routing as well, to ensure that users don't hit an engaged tone. And that is the main bugbear for Demon users.

Paul described these changes with a sense of pride. He had been given a task far bigger than he had expected in an area new to him and it had gone live. The big investment had been in network capacity. Network capacity determines the speed of response which users receive when they dial in to their internet service provider. It is a major measure of quality. Unipalm-Pipex seemed to have got it right. "Things that'll get in our way ... we move them out the way". They were able to upstage their main competitor because they could give a quality response. What I had not realised at the time of the conversation with Paul, but was revealed to me much later in a conversation with Peter Dawe after he had left the company, was the sheer scale of the investment Unipalm-Pipex had made. I'll let Peter tell it in his own words:

" there was no-one spare apart from Paul so I went to Paul and said "Go and get more modems, modems in 4 - 6 weeks. How quickly can we do it? Find out as fast as you can. So anyway we came out of that, five hundred new modems in about six weeks and he came back after two or three weeks and said right "Well I've got 250 modems ordered and I've got 250 lines" and. I was so cross. "I said 500. And when you've got those 500 go and get another thousand." And all of a sudden he thought "Ah. You're not kidding, are you, about this?" It's a case of if you're going to do it, go for it. OK and he went off and got 500, got the 1000, didn't need the whole 1000. Cost us a million pounds that mistake. It actually sort of points to the expenses. It cost us a million pounds and probably made that business. There's a lovely post-justification for it. Because he'd gone, the key thing is that those events, Paul all of a sudden understood that we were in this business, you know, we weren't playing around. And we've got to make a success. You know, you make the decision and you've got to make it work. Of course one of the consequences of that, going from 120 lines to 1600 is that you actually need ten times more customers. So all of a sudden it was no longer a problem of lines, it was a problem of customers, we had to go and get customers. Cos the money was going out the door. So that that those events kicked Paul in. He got belief in himself, he actually did it as well,

OK so he got belief in himself, a nice self fulfilling, up the spiral for Paul. And the other interesting thing though is that because Paul went in for 500 and then asked for a thousand all of a sudden the Telcos took us seriously in this business. Mercury, Energis, BT what have you all of a sudden they started talking to us about discounts and you know. Occasionally people come for a 500 order. No one ever goes 500 then two weeks later asks for another 1000. Doesn't happen. So all of a sudden it kicked over the Telcos into realising that it was a serious business And that Unipalm was a serious player. And that goes for the modem manufacturers. All of a sudden we went from being a customer to being a strategic partner."

The last point here is very important. By expanding ludicrously fast by industry standards - buying 1500 high speed modems at a cost of several million pounds in a very short time-scale, Unipalm-Pipex changed the perception of the industry. It enacted its own environment. The Telcos (industry-speak for large telecommunication companies) such as BT, Mercury and Energis suddenly took notice and the world had changed. This is symptomatic of the Unipalm-Pipex approach. Dawe's sense of the market plus his rush of blood in Action Man mode was just right. It could have destroyed the company but it transformed Unipalm-Pipex from seeking capacity to seeking customers and made it a major player in this market. The strategic routine involved creating a decision from which the company could not back down. Changes in the market were analysed fast. The analysis was then put into operation at a big scale. Paul Rivers called these "brave decisions". If the analysis was correct, the outcome, as in the modem story, was a success for the company. If this pattern of jumping in with both feet had been wrong, it is likely, in this case, the company would have failed. This is a formative practice of the strategic routine: make decisions and take irrevocable steps. As Dawe said, "It's a case of if you're going to do it, go for it."

Rivers did a good job. At the end of the research period he was the only remaining contact still working for the company and was in charge of the Dial project. It may well be that his success with Dial, and the initial frisson created for the Telcos when he bought the modem capacity, was influential in MFS (one of the Telcos) taking an interest in the company and proposing a merger. That was never suggested but it is plausible that the change begun by the modem purchase resulted in the large telecommunications companies taking the new internet service providers much more seriously.

A routine?

Well-defined operational routines existed in the company. Action man mode and the modem story tell us about emerging routines at policy levels in response to change and as a generator of change. There is a consistency of behaviour and a regularity which reveals itself in many aspects of the company's practices.

Unipalm-Pipex was successful. It had moved fast, generated profits from distributing software and a rapid increase in share price on the back of internet service provision. It was becoming a major player in a market which, apparently, lots of people wished to enter. It appeared to be a self-confident company. What it had done, worked and it continued to operate in that way. If the company had been unable to incorporate change, it is likely that it could not have survived. And the way of doing things was an aggressive, go-getting, abrasive style, driven by a fear of failure.

The modem story tells us how decisions were made fast. A cover disk on a magazine took off unexpectedly well. The implications of that were rapidly assimilated (by individuals who had a record of apparently successful judgements and a particular world view). The response was to force change by developing the product extra-ordinarily fast, involving steps which committed the company to the change. It could not back down.

This routine had evolved in the company and by the time of the modem story was certainly established, if not entirely sanctioned. It enabled the company to incorporate change. The underlying rule appeared to be: react very fast and at scale. The practices which followed from this rule were the aggressive, sometimes abrasive behaviours, with little self-conscious reflection, outlined in the stories.

Strategy was developed in other ways too, at Unipalm. The stock exchange flotation involved many meetings, debates and presentations and was more thoughtful, but in responding to perceived market changes and opportunities the strategic routine outlined here, and exemplified by two stories drawn from the fieldwork, typified the company's strategic practices.

We cannot know how long the company could have continued if it had not merged with UUnet. The sheer energy and stress involved in operating in this way casts

doubt on the routine as a long-term pattern of behaviour, but that does not mean that change cannot be incorporated long term as the next chapter will go on to show.

The routines (developing and actual) were rooted in the history and culture of the company. The company's structure (and changes in its structure) and the changing market, plus the skills and competencies of the main agents and their search for security were also implicated. We need now to consider these factors to gain more insight into the creation and reproduction of routine behaviour at Unipalm-Pipex.

6.3 The culture of Unipalm-Pipex.

There were initially two distinct cultures at Unipalm-Pipex: one operated in the Unipalm distribution company, the other in the Pipex internet services provider. Unipalm had a relatively well-established culture with clear operational routines. Pipex interpreted its world as chaotic and aggressive in which the only predictable feature was change. With hindsight it can be argued that Unipalm and Pipex were incompatible and that the initial intention to spin different companies off was the most appropriate strategy. After he had left the company Peter Dawe put forward this view but in early 1995 he was determined to merge them. The two cultures interpreted the world, and the kind of behaviour appropriate to it, differently. Different images were framed about the company and the world it occupied.

From Unipalm to Unipalm-Pipex

Whilst the bringing together of Unipalm and Pipex into one company was a small change in comparison with subsequent developments it was significant for the company in setting the foundations for those developments and had symbolic importance within the organization (Pfeffer 1981, Johnson 1990). Reflecting back on the company several years after this change Paul Rivers put it like this:

".... taking it back to the early days, Unipalm, a distribution company, was changing no quicker than any other distribution company. I think the merging of the two halves of the company has a change with a capital C, brackets great upheaval instead. Marked a turning point in that we entered a phase of tumultuous change and it hasn't really stopped."

It is worth reflecting on this change, therefore, (though, chronologically, the merger preceded the stories set out in section 6.2). The process took place over a period of years but the specific changes were relatively speedy. To understand the

significance of the merger and to uncover the different cultures in Unipalm and Pipex, it is necessary for us briefly to go back to the period before the merger.

Unipalm was, in many respects, typical of new start-up companies: it began life as a single proprietorship under Dawe and developed as a group of partners who had similar ideas about possibilities in an area of new technology. Dawe showed considerable self-confidence, perhaps arrogance, in walking out of Unipalm to develop his own ideas. He showed little appetite for compromise but he found the period he spent outside the company very painful though this did not show in his actions.

In subsequent changes similarly aggressive approaches were adopted by Dawe and others. The personality and approach of the founder could be seen in the organizational practices of the company, even when it had grown to a significant size. New start-up companies reflect their founder's approach when small because at that stage the founder is usually the primary strategic agent. This is not unique to Unipalm of course, the other companies studied here also provide evidence of their founding principles in their subsequent behaviour and this feature has been recognised elsewhere (Child and Smith 1987). It is part of the path dependent process along which firms evolve.

Dawe and Williams thus established themselves as Managing Directors of Pipex and Unipalm respectively. The two businesses were developing largely independently. Differences between them went back to the early days of the company but there was a general recognition that they should be working together. Dawe claimed that the distribution business was becoming lethargic, though highly profitable. TCP/IP links largely sold themselves, he claimed, and a new impetus was required. From the Unipalm side, Pipex was seen as aggressive and arrogant and was not contributing to the net revenue of the group. Unipalm sales staff were finding themselves responding to queries about internet connections from their customers, whereas Pipex staff, in adopting a quasi-evangelical approach to internet connections, were frequently ignoring the software needs of their customers which could be provided by the distribution business (Interviews with Rob White 1995, Bill Thompson 1995). Collaboration was therefore one-sided. Unipalm staff helped to obtain business for Pipex but the reverse was not the case. It had been difficult to build a market for internet connections initially. Pipex sales staff needed a certain level of aggression, it was claimed, but the two businesses were failing to work

together in ways which would clearly be in the interests of both. Rob White worked on the Unipalm side of the company but he could see the problems faced by Pipex:

"I think that to achieve a substantial position in the Internet market for cables you'd have to be very, very aggressive. In your marketing, your recruitment. I think Pipex was built up with the right attitude of mind though. Let's build this thing as fast as we can, we've got the money to do it, we've got to become the major, dominant player before we get swamped by other players. And to be fair I think Pipex have achieved that pretty much. I think you know the only danger, the only thing that spoils Pipex achievements has been the relationships they have with a number of customers who have found them arrogant and difficult to work with. Or very unresponsive purely because the business is growing so fast."

There were problems, therefore facing the group and the way in which different businesses should work together. As referred to briefly in section 6.1, the group established a "task force" to work through the issues raised. Such a formal approach was unusual for the Unipalm group which normally worked in a relatively informal way with a flat structure. The task force's proposed solution resulted in a major change of direction. Bob Williams resigned, taking a substantial financial benefit, reputedly over £2 million, and the whole group was brought under the direction of Peter Dawe.

The task force never formally reported to the broader company. It was overtaken by events. Different interpretations were made of this:

"What happened to the task force was it sort of ceased to exist and I use the term sort of deliberately because it epitomises the rate at which we're changing. Very often you can try, you can, people in this company repeatedly make an attempt to sit and plan carefully and plan changes, implementation of plan, time scales and so on and so forth but those changes begin to take place before you've even written the plan and so as soon as we had an inkling or any reasonably clear picture of what the task force was likely to recommend, before we began to write that down and document its recommendations and formalise what was going on, we hit the go button and it was all happening. And that's really what happens in this company time and time again."

This was the explanation given by Paul Rivers. Rivers was originally in the Unipalm side of the group. His experience of working for major corporations had given him a model of behaviour which included formal planning and implementation. In the wider Unipalm group (at this time, Pipex was simply one part of the group) this was not the approach adopted. Ideas would be tried out in discussion in different forums. They would filter through into the general consciousness and then be modified or implemented. This process was not formal and Rivers saw it as symbolic of the way

the company operated. Bill Thompson had a different interpretation. He saw the task force review as a relatively cynical attempt by Dawe to remove Bob Williams in a legitimate way. Thompson's analysis shows a recognition of some subtle processes. During the period of the task force's deliberations he gave his prediction of the outcome:

"And it's interesting to watch. I mean, sort of, I suspect that in six months time you'll find that changes that have happened, despite the fact that we had a sort of task force of 20 people working on various reports nobody will be surprised at the changes because they were all predictable if you listen to Peter and, sort of. Those of us. Let's talk briefly about the task force. It's been obvious for some time, for those of us who listen to Peter and talk to him, that he had an idea about the way things ought to go, in terms of bringing the two functions together and merging Unipalm and Pipex and his desire was essentially keep the Unipalm brand name but add the Pipex name to it, and to gradually move Unipalm into Pipex. In a sense to take all the functions of Unipalm Distribution, leave the rump of some of the products there for resellers but basically grow Pipex to swallow the whole company. And that was obvious four months ago. The. Many of us feel that the formation of the task force was an attempt to validate Peter's desire, have it rubber-stamped and make it appear to be the result of some serious political evaluation of the situation."

Six months later Thompson justified his earlier analysis in more individualistic terms:

"Peter's vision for the way the company should go won out and Bob - who'd been seen as increasingly irrelevant - was asked to take his two million pounds, his ninety thousand pounds for next year and walk. And what, the battle that Peter won was bringing the two parts of the company together. Basically creating this single solutions provider from Unipalm Distribution and Pipex. And putting the Internet at the core of that, even though the Internet business is a small proportion of the total turnover of the company and the bit that's losing lots of money, it is seen as the way of the future. it was obvious Peter was going to win, Bob didn't care enough. He cared enough possibly to try to stop things but not enough, perhaps, to try to take the company in a different direction - important difference.

Thompson's comments were broadly confirmed by Dawe. He believed the distribution business was not performing as well as it should and saw the removal of Williams as the way to resolve the problem. However, after he had left the company he regretted the decision to merge the two companies:

"Yes. And actually I think that was one of my biggest mistakes. It seemed like a good idea at the time..... Because they were different businesses. They actually, the actual two businesses had different cultures in them. Something I hadn't recognised."

I reminded him that one reason for pushing for the merger had seemed to be his wish to remove Bob Williams.

Peter Dawe: There was also the issue about sidelining Bob. I didn't have anyone there who could replace Bob as head of the Distribution business. And of course my justification for getting rid of Bob was there wasn't that post there so. Actually, the more I look at this, Unipalm and business in general, the more I want to make the businesses independent where they are different types of business. Consulting is consulting, software sales is software sales, server is a server. They are fundamentally different businesses and they don't mix. The only way to do it is to keep them relatively separate. You make sure they do business together and talk to one another and go in the general direction of the company but you can't mix and match them, it doesn't work. We tried and failed.

In this conversation Dawe reverted to his original ideas about the company. His belief that Williams was holding back the company was typical of an interpretation which was widespread at the company that problems arose from the incompetence or lack of energy of individuals. This belief pushed him in a different direction and it was only with hindsight that he fully appreciated the different cultures which were then lined up in some respects in opposition to each other. Relatively short term expedients had thus defined the possible options.

The fact that the task force never formally reported its findings within the company is also typical. Rivers interpretation justified it in positive terms: change was so fast that the company had to respond before formal reports could be written. However this needs to be contextualised. Dawe was determined to remove Williams and used the opportunity provided by the merger to do so, indeed probably partly manufactured the need for merger in order to remove him. For more junior members of staff the unco-ordinated filtering down of change was interpreted as weak communications and uncertainty about exactly what was going on (Interview with Sarah Broker 1995). But the rate of change was so fast, at times, that no-one knew with certainty what was going on.

Cultural conflict

Change *emerged* in the wider company (Mintzberg 1978) in response to immediate needs and a sense of the longer term. The environment was perceived as turbulent, especially for Pipex. In the company as a whole there did not appear to be the time nor the incentive to plan carefully and to implement the plan. Any plan would have been out of date before it was published. What happened was a series of

discussions, centred around Peter Dawe, with a number of favoured colleagues. The outcome of the discussions would filter down into the company by individuals taking note and deciding to adjust their approaches to accommodate the proposals being mooted. Dawe would sometimes get angry with people who did not take initiatives and responsibility for their actions. He would then march in and take action on their behalf ("action man") but in general continuous change was generated and accommodated by those around Dawe being alert to their environment and to his ideas.

This was confusing in the company. There were established procedures, based on BS5750, and built in to sales bibles but at the same time there did not appear to be time to plan carefully. Different, contradictory messages were being given. Unipalm staff felt uncomfortable and pressured. They interpreted their world as relatively stable and built relatively long-term relationships with customers. Pipex staff needed the security provided by Unipalm but their world required a rapid response and there was insufficient time to worry about personal relationships. The meanings lying behind these interpretations were often incompatible. The best way forward, therefore, was (for senior staff) to try to accommodate to the latest idea or (for more junior people) to get on with the job and sometimes become exasperated.

This was not simply a strong man insisting on getting his way. Dawe had firm ideas and a forceful manner but his ideas were bounced off trusted colleagues, and their manifestation in the company required real changes in practice not simply in approach. Furthermore Dawe's ideas were widely respected. The way those practical changes impacted on the company then had a recursive effect on the original ideas, providing legitimacy and indications of future directions. Ultimately the focusing of the company under Dawe's direction required structural change. The Pipex and Unipalm staff found it difficult to work together. Teams were broken up and reconstituted with staff from both businesses. As we have seen, this reconstruction was painful. A large number of experienced staff left the company. They recognised that the two sides of the company must be brought together but found the new structures, or the manner in which those new structures were achieved, unpleasant. The different cultures of Unipalm and Pipex rubbed up against each other and created tensions. Internal change was partly generated by these tensions and controlled and absorbed in a relatively *ad hoc* way by Dawe and his senior team. The culture was reactive and responsive and based in a knowledge and experience of the internet acquired through being there from the beginning.

Ultimately Unipalm and Pipex did merge. But the refocusing of the company as an internet services provider and the insistence, which arose from the merger with UUnet, that an internet angle should be included in every deal, meant that the old Unipalm distribution business virtually disappeared. Many Unipalm operational routines were incorporated into Unipalm-Pipex but the overarching culture of the merged company came primarily from Pipex.

6.4 Conclusions

Operational routines embedded in the technology and linked to standard patterns of distribution were ultimately adopted throughout the company. The operational activities of the company were securely tied into the electronic systems the company used and there was a reassuring predictability about them. They were changing but in ways which were built on previous experiences. Operational memory, and routines embedded in the software, changed slowly as the software and needs of the staff developed. This was a stabilising force within the company and allowed it to go about its day to day business effectively. It was based partly on an industry recipe concerned with sales of products which are technically complex and require customer support.

Developing a strategy for the internet side had no obvious recipe. The internet itself has been viewed as a network which opens up new horizons, in which people are not heavily constrained. Attempts to control the internet by commercial organizations or governments have been strongly resisted by the original “cyberfreaks”. Internet people have an image as anarchic, enthusiastic, technologically obsessive and sometimes arrogant. This image idealises the individual and particularly the “wacky” non-conformist who is keen to do his or her own thing. Pipex had something of that culture about it and in a broad sense matched the wider image of the internet. Changes frequently resulted in pain for individuals and discomfort became institutionalised. This was part of the incorporation of change in a turbulent environment.

The technology was a constitutive element of Unipalm-Pipex. Paul Rivers has already set out this interpretation in section 6.2. He made the point more subtly but perhaps more tellingly in a different conversation, though on this occasion he was talking about the whole Unipalm-Pipex group after the merger with UUnet, not just the Unipalm side:

“So how you convey the mood and the meaning has had to be a specific topic within that, because it is so important. Electronic mail has scaled very nicely with the company. We have electronic mail that is as good and effective as when the company first started using it, with about six employees. People use it naturally. There are some people in the company that don't actually talk to anyone any more, they just stare at a 17" dome or piece of glass all day and that's fine. You can actually be very productive. It allows you to commune, use one communications medium to have an interactive conversation with somebody, get your answer back two minutes later and you bounce another comment back two minutes after that. Threaded, inter-threaded through the course of the day, you can have a complete conversation. Or you can leave a message for someone. They don't have to be there to take that. And from my point of view, from a management tool allows you to be kept informed as to what's going on.....All of the members of the intelligent team's here, so it's a good way of communicating at a team level. Now I don't drive the team by the day. I sit at my desk, and I can be having a conversation with you and mail is coming in all the time and those that are aimed at consultants I can see reasonably easily. So whenever there's a quiet five minutes I can just go through this, and I'm up to speed on everything that's going on.”

Rivers was describing these features in what was then UUnet-Pipex. He demonstrated what he was saying from his own desk. There was much more of a big company feel. Rivers had his own room. His “Dial” team were in the adjoining area. He pointed proudly to one customer advisor who was practising juggling whilst talking to a customer on his hands-free phone. The culture was shifting but at the heart of it was the technology that made it all possible.

The company thus focused on technology in a deep sense. Technology formed part of its way of doing things which was unquestioned. Informating was taken for granted and operational routines were embedded in the technology.

Orlikowski's distinction between technology as artefact and technology in use is revealing (Orlikowski 1995). The technologies which Rivers was then using were common place. E-mail systems and advanced telephony were no longer the state of the art. The product enhancements he used to attract custom, he admitted, were not sophisticated. Value was added for customers by giving multiple e-mail addresses or more web space in the standard package. But the technology was everywhere. It was pervasive and part of the UUnet-Pipex world. The social and the technical are thus inseparable. They are different units in a network (Latour 1996b, Walsham 1997), which through their relationship with each other and the organizational and social structures in which they are nested, interact in the reproduction and transformation of routine behaviour.

The strategic routine which was adopted at Unipalm-Pipex was a fast moving, aggressive response based upon an immediate assessment of the relevant circumstances and a belief that it was important to move faster than the competition. The company continually took decisions which redefined the environment and moved into unknown, and unknowable, territory. The routine was adopted by managers throughout the company. It was the way things were done and taken for granted. This was a set of strategic practices in the company. The routine is not the same as company culture. Culture establishes shared meanings (Hall 1997), and is deeply implicated in practices, but the two are separate.

The strategic routine arose from a range of factors. The culture drew partly from the personal style of the key agent, Peter Dawe. The rate of change of the environment and the insecurity this created in the company's staff was also influential. The routine seemed to work and it provided a route map through uncertainty. The modem story is a rich example of this and also illustrates well how the routine itself changed the environment: Unipalm-Pipex suddenly became relevant to the major companies in the industry. In the modem story the company responded fast to the unexpected demand for its new product. The opportunity was perceived and followed through. Dawe saw the need to enter at a large scale. This was based partly on his knowledge of the market place and partly on his "action man" style, which had become part of the company way of doing things. His style had become locked in to the routine. It became difficult for him to operate in any other way. People would not come to him for "affirmation" (the word he used in discussing difficulties of delegation) of their proposals so that he had continually to determine what went on. Other staff also operated in similar ways to Dawe. Paul Rivers drove the modem changes through but expected the environment to change and was continually looking out for new and unexpected events. This produced the adrenaline which got him out of bed in the morning.

Internal company structures and relationships also played a part in developing the strategic routine through interacting with each other and the external world. Peter Dawe's over-riding of the Sales Director in breaking up the Pipex team and his discussion of the rumour mill exemplify this mechanism: his relationship with the Sales Director illustrates a company structure which was loose. Little respect was paid to established reporting lines. As a result rumours became extensive as a means of communication, partly because conventional reporting lines seemed unreliable or contradicted the apparent direction of change. These things were happening throughout the company, however, and were not peculiar to Dawe. The

Director of Sales, himself, reportedly took decisions which rode roughshod over his staff. The company was not anarchic nor driven by Dawe in the guise of an archetypal, single-minded entrepreneur. Both those images - anarchy or single-minded dominance by an individual - miss the sense in which this company hung together through the co-operation of, and competition between, its members, running all the time to survive by staying ahead of the rest of the market.

The strategic routine then incorporated change. It did not respond to change nor reflect on change but took change as the norm and in doing so was itself implicated in many of the changes facing the company. Structures and norms, both external and internal, changed as the company or staff members interacted with them. There was a groping towards a regular pattern of actions as individuals within the company began to impose meaning on the swarm of events.

As the company grew, and ultimately merged with UUnet, the interpretations became more sophisticated. Paul Rivers comments in my final meeting with him, several months after the UUnet merger, indicate how some of the immature strategic practices of Pipex had matured:

"There was the flotation, there was - this is all in the last two years - flotation, we merged the Unipalm and Pipex halves of the company. We built the Dial business and restructured into two key, well three key core trading parts of the organization. We've merged with UUnet, American company, which again was more change and now, sitting on that bulletin, is the next change. MFS and UUnet have agreed merger, so in September it's 'As you were lads, let's throw all these coins back up in the air again and see which way they land now.' And you actually become quite adept and accustomed to working in that kind of environment where you can say 'Well who do you report to?' 'Does it really matter?' Does it really matter, because it's going to be someone different, you know, and you're constantly trying to build relationships not to the point of necessarily an employee with his boss in the traditional sense but as a colleague who, you could easily find the person who is your boss today working for you in six months time or working alongside you or in an entirely different part of the company. Someone you can rely on to pick the phone up and say 'Hey John, have you got a minute?' Through the relationship you built working together before. It's a much flatter structure than most. And it's a much more, we're all in this together, let's all get stuck in and help each other out."

Rivers is showing how the expectation of change had become institutionalised.

At Unipalm-Pipex the operational routines were secure. Beyond the narrowly operational, we can observe a regular pattern in the approach of the company to the changing world it faced. Looking for such patterns helps us to understand the firm's behaviour. My initial image of Unipalm-Pipex was opaque. It was difficult to know what was happening and why. The staff interviewed also professed difficulties in keeping up with what was going on. However, searching for patterns in working practices, which I have argued are sufficiently regular and sanctioned to be seen as routines, enables us to see how apparently diverse behaviour fits together. The world of Unipalm-Pipex, like the other case-study companies, was constituted by a recursive understanding linking structure, agency and technology and external frames of meaning, or recipes. Recurrent strategic practices arose from this which, in this case, were able to incorporate change. The existence of such routines is not peculiar to Unipalm-Pipex, however. The next chapter goes on to show how a company with an apparently very different culture also developed routines which incorporated change.

Chapter 7: Chadwyck-Healey, change, routines and cultural contrasts.

7.1 Introduction

A visit to Chadwyck-Healey leaves a completely different impression from a visit to Unipalm-Pipex. The company is in a different industry and has a different atmosphere and style. In a great number of respects, however, the two companies were very similar. Both were operating in a rapidly changing environment in which they had a formative influence in the invention of a new market. Change was driven by both companies, not simply responded to. Both companies experienced a major change in orientation. This chapter will explore the changes at Chadwyck-Healey and assess why its path was different from that followed by Unipalm-Pipex, even though many of the circumstances it faced were similar.

The contrast between the two companies will be used to demonstrate that strategic routines which incorporate change can be found in different environments. Such practices are not unique to Unipalm-Pipex. In examining the differences and similarities between the two companies, I shall continue the analysis of the factors which are influential in the reproduction of routines.

The strategic routine to be examined here can be encapsulated in a phrase which was used, in slightly different forms, by many people at the company, "You're only as good as your next project". It meant that the company espoused an orientation which looked to future developments rather than resting on existing products and practices and I shall examine those claims. Lying behind that espoused approach were different cultural norms from those found at Unipalm-Pipex but also elements of "action man". It was also clear at Chadwyck-Healey that the links between strategic and operational routines were important, that some strategic practices would have been impossible without particular operational routines.

The chapter will focus on the development of a new product at the company, called *Lion*. Through the consideration of that product and other developments in the company which were linked to it in different ways, I shall demonstrate how a primary strategic routine worked in the company and analyse the factors on which it was based.

Background to the Company

In November 1996, in a news item on its web-site celebrating the award of the Queen's Award for Export, Chadwyck-Healey described itself as follows:

"Chadwyck-Healey is a publishing company which specialises in reference and research publications for the academic community, public libraries and business. It publishes in a variety of media, including CD-ROM, microform and paper, and will launch next month its first Internet service. Its main export customers are university and other research libraries in continental Europe, North America, Australasia and Asia.

Since 1991, when it announced The English Poetry Full-Text Database, Chadwyck-Healey has become the world's leading electronic publisher in the humanities and is converting the printed texts of the past into digital form on a scale unmatched by any other publisher. English Poetry contains over 165,000 poems by more than 1,250 poets, the equivalent of 4,500 printed volumes."

It continued, after a description of some of its literary databases,

"Literary databases are not the only publications which Chadwyck-Healey sells strongly overseas. The company markets, for example, the CD-ROM editions of The Economist and six British national daily newspapers, The British Library's catalogue and national bibliography and the British Film Institute's database on films and film-makers, Film Index International. International publishing partners include the United Nations, the Office for Official Publications of the European Communities, the National Security Archive in Washington DC and the State Archival Service of Russia.

Chadwyck-Healey Ltd, based in Cambridge, is a privately owned publishing company established by its Chairman, Sir Charles Chadwyck-Healey, in 1973. It has sister companies in France, Spain and the USA. In 1987, when it won its first Export Award, export sales were £970,000. 24 people were employed in the Cambridge office. In the year to June 1995 export sales were over £7.5 million and staff numbers had risen to 102. Since 1993, export sales have increased by 135%. Chadwyck-Healey Ltd now employs more than 150 staff in Cambridge." (Chadwyck-Healey 1996)

The press release gives a good sense of the company. It is low on hyperbole, changing fast, with an emphasis now on *electronic* publishing. It sees itself as a publisher not a provider of electronic services. Figure 7.1 confirms the claims made in the company's press release.

Table 7.1 Chadwyck-Healey Ltd., Company Financial Profile

(All figures are given in £ sterling except where stated; columns refer to the financial year ending in the month indicated.)

Source: FAME Financial Analysis Made Easy Database.

	06/96	06/95	06/94	06/93	06/92	5 yr average
Turnover	9,741,290	8,944,655	7,747,070	5,037,960	4,093,348	7,112,864
Profit before Tax	666,492	1,179,664	1,001,307	232,671	-217,867	572,453
Net Tangible Assets	2,185,161	1,907,587	1,125,541	558,841	390,067	1,233,439
Shareholder Funds	2,164,143	1,807,961	1,101,244	540,897	369,659	1,209,380
Profit Margin (%)	6.84	13.19	12.92	4.62	-5.32	6.45
% return on Shareholder Funds	30.80	63.05	90.93	43.02	-58.94	33.77
% return on Capital Employed	30.50	61.84	88.887	41.11	-54.03	33.66
Number of Employees	132	102	78	63	53	85

The company was established by Sir Charles Chadwyck-Healey (the title is hereditary) in 1973 as a specialised publisher of research material for university libraries throughout the world. It is a private limited company. At the time the company was founded the economics of reprinting were deteriorating and a move to microfilm/microfiche seemed to be sensible. Sir Charles's previous employer was not interested and so he decided to move into that market place himself (Interview with Sir Charles Chadwyck-Healey, March 1995).

Microfilm/fiche seemed to be an ideal medium. There were no stock problems and the technology was relatively cheap. The initial project was to microfilm publishers archives plus some parliamentary papers and initially, to establish the market, the user-technology, microfiche readers, were given to customers free of charge.

The major new development in the early years was the publication of the catalogue of non-official British government publications (non HMSO). The project started in 1979 and first publication was in 1981. In 1987 this was combined with the HMSO database. Now a complete catalogue of all British government publications is published on CD-ROM. This became a major revenue earner for the company and permitted the development of subsequent projects.

Sir Charles became aware of computer-related possibilities in the early 1980s. He first saw CDs in 1984, realised the CD was an appropriate medium for the company and that he should watch for the arrival of a CD market. He saw it as a natural progression from film/fiche. Existing product lines needed machines to read them. There was no change in culture required in the company to move to CD. Similarly the company is used to working on a one to one basis with end-users. Average booksellers were not oriented to selling CD-ROM products. Rather like book publishing, CDs require a high initial outlay (for coding) then subsequent reproduction is relatively cheap.

The first project on CD - the poetry project - was announced in 1990, orders were taken in Spring 1991, first deliveries were in 1992 and the project was completed in 1994. Newspapers were put onto CD-ROM in 1992. In late 1995 initial ideas about a virtual library were being floated. This developed into 'Literature on line', known as *Lion*, which was unveiled in the first week of December in 1996, and which now forms the core of the company's development activities. The analysis here will concentrate on the way in which *Lion* developed.

Staff directly participating in the research at Chadwyck-Healey

Four staff from Chadwyck-Healey participated in the research:

Sir Charles Chadwyck-Healey who is the company Chairman and founder.

Stephen Pocock who had been with the company for 6 years when the fieldwork began and held a relatively senior position as a Managing Editor. He was responsible for the conversion of text into computer-readable form. The process

was known in the company as “data conversion”. It involves substantial coding carried out largely by Stephen’s staff in Cambridge and the keying of the coded data primarily by independent suppliers based in India and the other parts of Asia.

Duncan Christelow who was the Sales Manager for the UK and Eire and had been with the company for over 5 years at the start of the fieldwork. Chadwyck-Healey had operated with a specific sales force only since 1989 and Duncan had therefore been at the company from the early days of a dedicated sales team. Duncan had worked for a major publishing company prior to joining Chadwyck-Healey.

Alistair Laidlaw joined the company, 3 months before the fieldwork began, as Chief Accountant. He was in his twenties or early thirties and had worked in the accounts department of a small company in an entirely different sector prior to joining Chadwyck-Healey.

No very junior staff participated in the research interviews at Chadwyck-Healey. Interviewees were nominated by the company and it reflects the company’s view of itself as a professional organization (which is discussed below) that only staff in those categories were selected. I spent some time talking in general terms to, for example, the Personal Assistant to Sir Charles in order to check that my perceptions were not out of line with a broader view of the company but these conversations were not recorded.

7.2 The culture of Chadwyck-Healey

The shared goal of the company was the publishing idea. Without project ideas, it was claimed, the company would cease to exist. The phrase which was repeated around the company has already been commented upon, “The company is only as good as its next project”. The publishing idea was a goal of the company and the importance of projects infiltrated conversations with all staff. Alistair Laidlaw, was newly appointed as Chief Accountant when I first met him. At that time he did not use the phrase. A few months later it tripped off his tongue:

“I think this is true about any business but Chadwyck-Healey's case you're only as good as your next project. So that and this is, I think this is me appreciating what the business is all about.....”

Charles Chadwyck-Healey used the same phrase in a similar way:

“.....But it is a strength in that after a time once a project is conceived and on its way, as far as I'm concerned it's in the past. And you're only as good as your next project, as opposed to your last one.”

A lasting image of the company is the concentration on new product ideas and this focus cannot be over-emphasised.

Ideas were developed in an atmosphere of financial conservatism. Charles' measure of success was tied in to careful financial management. The company was coming up to 25 years old, which by the standards of many small companies, particularly those concerned with new technology, is a good age. Charles used the company's longevity as a success measure but explained it largely by the conservative way the finances were managed and the fact that, as a private company, there was no-one else to whom an answer must be given:

Charles Chadwyck-Healey: I think the reasons why any business succeeds is difficult to answer in a kind of constructively, because first you have to measure success. I would say that in certain people's eyes you could say that Chadwyck-Healey has effectively failed over the years because it started a very long time ago, I started in 1973 and has only grown by, you know, X amount in that period, when business in such an attractive and potentially profitable area if properly managed and thought through should have been ten, twenty, a hundred times larger, I mean, you can take your pick. We should have gone public ten years ago, we should have done this, that and the other, so, you know, what is success. If you are talking about survival and profitability then sure we have survived through at least three major recessions, the '73-'74 recession, the '79-'80 and the '91-'92 and I suppose that in itself is something. And I think it's basically been a combination of being prepared to take what appear to be risks in choice of products, publications, which appear to need a large investment to get them off the ground, combined with what is actually a very conservative way of running the business, particularly from a financial point of view. We have never borrowed very much money, we have always written down our work in progress fairly aggressively so that we do not delude ourselves in believing that we have assets which are really worth much less than they appear on the balance sheet. And we have never, for instance, put a value on good-will. We've never tried to be profitable, fix, by kind of fixing the figures, because we've never really had an audience whom we've had to impress other than possibly a bank. And we've always, on the whole always paid attention to cash flow. And when we haven't paid attention to cash flow it's usually been, it's caught up with us very quickly.

This attitude was firmly held and reinforced by the experience of observing other companies over-reach themselves and go under. *Lion* implied a potential reduction in financial conservatism and this will be picked up in section 7.3.

Whilst it may have been "a very conservative way of running a business", Charles continually reassessed his role. He had not always done this but it was clear during the fieldwork from the way he talked about the company, to the books on management which he read, to his use of a consultant as a "directorial therapist",

that he was self-conscious about the role which he played. In conversation, he mentioned several times the way in which his approach to managing had changed:

".....I didn't start off years ago as a people person, as a natural leader or manager of people. I had actually a very negative view of the role of other people in the company that I wanted to set up. Basically it was, I think as you've already quoted, it was me and a bunch of helpers. Obviously I wanted to, I valued them, 'cos even from day one I had one or two extraordinarily able and loyal people, but I am also extremely short-tempered so they got it in the neck. If I was having a bad day I made sure they had a bad day as well. And it took me years, I mean, more than, I would say ten to fifteen years to really come to terms with the fact that if you assembled a group of people around you to, or the act of assembling a group of people around you to do something was more than just hiring helpers to do specific tasks, the company became, as you added more people you gave them more responsibility. In a way it was no longer such a, just a kind of ego trip. It was, the company became something else. And you might technically own it and have your name on it, but in a strange way it was no longer really yours, in the true sense of the word. And then, as I was able to find very competent people at a senior level I found I was able to begin to relax and not feel that everything was, kind of, resting on my shoulders. And I suppose that was toward the end of the eighties and really suddenly began to actually enjoy the dynamics of having a group of people to manage, and the larger we've got the more fascinating I think it is, and the more I enjoy it. Because if you have over a hundred people and most of them are young, many of them in their first job, I find inevitably I think more and more about what can we do for them, rather than what can they do for us. You know, how can we motivate them, how can we train them better than - at the moment we give virtually no training. What goes on in their minds? What are they thinking about when they come into the office every day? I can remember only too clearly how I regarded my first job and a lot of the time it was sometimes I was very enthusiastic and other times I didn't want to come to work. So I imagine the same thoughts go on in a lot of people here.

Charles had shifted in the way in which he viewed the company. He used to be very much hands-on but became more detached. His role as chairman was up to him to define. He had no specific portfolio but remained the major source of the ideas the company craved. In this role he had the trust and confidence of his colleagues. All respondents commented on their respect for this part of Charles' work on several occasions. For example, Duncan Christelow, a humorous and likeable sales person but with the cynicism that goes with the terrain, put it like this:

Duncan Christelow:I think it's partly because we're in a good position in the market. I mean I believe that we could do more in the market, and I think that we have a very, very high reputation, a reputable reputation and I think that goes before us.

Interviewer: Do you deserve it?

Duncan: Well I think that it's, in many respects it's well deserved, yes. I mean for being very innovative, certainly, and Charles has been very, shown a great deal of foresight in the market and that goes back to the very beginning of Chadwyck-Healey, when Charles first started publishing.

Charles had been dominant in the company for the whole of its existence. It is only in the recent past, by Chadwyck-Healey standards, that the company had begun to have a sense of identity independently of its founder. Charles had a very strong sense that the company was a publisher and this had been important in the way in which the company had viewed itself and the industry in which it believed itself to be a part. The following conversation is informative. Charles spoke with more determination than in any other discussions I had with him:

Interviewer: It's a different feel from that. But it isn't a publisher in the way that, say, Cambridge University Press is a publisher.

Charles Chadwyck-Healey: I absolutely disagree. I've been thinking of trademarking the term "The World's University Press" because, except that it would infuriate CUP and OUP who are on the point of licensing things to us....

Int: I suppose actually it's interesting that Lion is, as it were, more like a publisher, and one of the reasons that I'm pushing on it is if you look at the, as it were, if I go to an editor at CUP that person will go through something that I write and will, as it were, correct it, and make suggestions about it, but will be changing things, whereas what your people will be editing is actually take exactly what is written and don't change it at all, it's a very different kind of role. They're adding things to it.

Charles: Well again I disagree. I mean you're talking about an ideal world. The typical academic text is usually copy edited by somebody aged about 18 who hasn't got the first clue about anything, well there are some very bright people there but I mean many many texts go through publishers, if you read them they're full of typos, they are quite clearly exactly how the author presented the work, with just a few minor changes.

Int: But they shouldn't be? I mean they should have been changed whereas you would get cross if somebody, one of your people changed a word.

Charles: They may not change a word, but just the addition of SGML² coding to a text can radically change it, because you are taking the text and you're trying to interpret what is important about it for the user. So if you go through to where we're keying Arctherus, the Italian Renaissance at the

²SGML stands for "Standard Generalized Markup Language". It is a generic markup language for representing documents which enables information to be separated from its presentation. This makes it possible to present the same information in different ways, for example using a hypertext link between different documents to access particular pieces of information. Hypertext Markup Language (HTML), which is a subset of SGML, makes it possible to have pictures and text on web pages.

present time and look at the books, the complexity of these renaissance books with their plates and their colophons and so on and that each of these has got to be accommodated in a computerised form, each illustration's got to have its own particular code number, you've got to deal with captions in a particular way, you've got to deal with the capital letters, it requires real intellectual understanding of the structure of the particular work.

The conversation continued with Charles insisting that Chadwyck-Healey carried out all the functions of a publisher but in a different way. I accepted his statement but said that it did not seem quite the same. He concluded:

"No no I know, don't worry. I've had an inferiority complex about it for, right from the beginning."

This is an interesting reflection. Charles did not appear to be a man with an inferiority complex but in piecing together other conversations it is possible to see a theme. In the early days, many observers believed that the company simply microfilmed to order. In other words that it did not take a risk in publishing information for sale. Charles resented this. He was not a technician providing a service to other creative people. The creativity was embodied in the company. Thus his insistence that adding SGML coding is a creative act, tells us how he saw the company and helps to explain the atmosphere in the company and the kind of staff who worked there. It felt like a high quality publishing house and had a professional and quasi-academic air. The building is modern and decorated with comfortable furnishings and high quality art. Attention was paid to the physical surroundings and staff treated each other with respect. It felt busy but not frantic.

Duncan Christelow confirmed those meanings. The company was essentially a publisher which was becoming more systematic.

Duncan: We were sort of traditional publisher who just produced for publishing's sake, on Charles's whim, really. He thought it was a good project. And that instinct has proved to be very successful but now we are looking at ways of perhaps evaluating projects rather more before taking them on....

And Stephen Pocock also defined the publishing nature of the company:

Stephen: It's to do with the nature of the editorial work that's involved. And typically the editorial work involved in data conversion is, our ideal is to intervene as little as possible in the process of text conversion. I mean, people who come in with editorial skills from other environments expect to be using those skills to change texts in some way or another. What we want to do is to keep the texts unchanged as much as possible, and just put in a layer of information that makes those texts

searchable or viewable, so it's actually quite difficult to get people to do that. And it's also those who come in with editorial skills where they are used to either copy editing or annotating texts tend to find it a rather tedious occupation. Because the intellectual input is different, the intellectual input is one of data analysis rather than content analysis. Structure rather than content is important.

The company is defined here as a specialised publisher with a distinctive style. It is not defined as a conventional academic publisher but the sense staff have of their work is more than simply reprinting or copying to order. It had a flat structure. Staff were left to do their own work in a professional atmosphere in which ideas were circulated with the emphasis still on looking for new projects. Duncan Christelow commented on this in the context of the establishment of a new department set up to seek out project ideas. He was responding to a suggestion that staff should channel any new ideas through the new department:

"I think now if we had ideas we would perhaps have a more certain route to direct them to. But I think Charles's idea of the whole company contributing to new projects is a bit fanciful. Anyway if I had a good new idea I wouldn't tell Charles about it. I'd go and do it myself. No seriously. Yes, I think it was a bit of an assumption that he might think that everyone would want to give their best ideas free of charge to the company. No but I mean obviously we do get feedback from customers and we, at least we would know now who to pass it on to. And something will get done about it, it will be raised in a new projects meeting and at least given a cursory glance by people in Michael's department. Before it probably was a bit more of a lottery as to whether it was considered because there were more pressures on....."

From Duncan's facial expression it was clear he was responding tongue-in-cheek when suggesting he would "go and do it myself" and his comment here shows how the structure of the company had been modified formally so that new ideas could be more easily assessed. The new department was intended to evaluate suggestions and to give staff a route for passing on ideas whether they came out of meetings between senior managers or arose from an observation made by Duncan or more junior staff. Duncan was cynical about "the whole company contributing to new projects" but he recognised that communication links had been set up which made this a possibility and enabled better evaluation to take place. The company culture of professionalism and seeking out new projects is well illustrated.

Thus, staff believed they would be able to make suggestions and that those suggestions would be taken seriously. Staff had access to decision-makers and there was a transparency in the company's procedures.

The basic culture was not democratic, however. There appeared to be a level of trust that staff would take responsibility to circulate ideas or issues which were potentially important. The structure of meetings was relaxed:

Stephen Pocock: The Board certainly meets monthly. The, there isn't too much information fed down from that meeting. We do have monthly meetings with all of the team leaders stroke project managers in Data Conversion and we started to have, I think, two monthly meetings with the Editorial Department as a whole, but I'm not sure that that's hasn't drifted away.

In a later conversation, around the time that *Lion* was becoming established, Stephen commented that there was a risk of drowning in a sea of meetings. He did not want nor expect so many meetings. The expectation, therefore, was of a relatively low-key approach with defined but flexible reporting lines. Stephen described staff attitudes to their jobs as equally flexible:

".... In the sense that to date, anyway, people have been, job descriptions have been fairly, well job descriptions actually never existed by the way. But the sort of jobs that people have undertaken have been pretty fluid. People have been prepared to move, the skills base we have is fairly non-specific. i.e. we're skilled in doing what Chadwyck Healey does. And when Chadwyck Healey does something else tomorrow then we become skilled at that. We have, in Editorial, a fairly flexible work-force."

Technologically the company harnessed the latest information technology. This was a major feature of the company. It did not simply follow the market but was at the forefront, creating the market. However the perception within the company was that there was not a focus on technology. Charles was quite adamant that the latest technology was a tool, usually to get out of a declining sector. Charles' statement below perfectly sets the context, as he saw it:

Interviewer:you've always been a company that has used the most up to date information technique. You have said to me in the past that that was in a sense only a tool, that was not the objective, but your actions, in a way, almost belie that, because you seem to have always been the first company to use microfiche, the first company to use CD-ROM, and the first company to use the Internet extensively. To what extent do you feel it's important for Chadwyck-Healey to be right at the forefront of information technology? Is that something that's important for you?

Charles Chadwyck-Healey: No it isn't. I mean this may seem strange and from what you've just said but really the delivery technology is not of great interest to us. We always seem to have been using a new technology to escape from a previously unviable situation. And I think this is very, very important to understand, because there obviously are companies which fall, people who fall in love

with technologies, who want to be pioneers and I think it would be completely to misunderstand where I come from if you thought that I was one of those people. You know I'm not a Clive Sinclair, I'm not an Apple person, I wish I was. I went into microforms and I was only in kind of insular British eyes would I be considered to be early. Because actually microforms had been around in America certainly since the late thirties and I went into it in 1973. So it was a totally mature market then, and a media, though the microfiche was somewhat new, but even that wasn't that new. It had been around for some time. It was the uses to which they were put that perhaps at that time were very limited. I went into microforms because I had been in reprint publishing before that, and the number of reprints, copies that you could sell of any one reprint had declined to such an extent by 1971/72 that it was no longer, printing was no longer a viable delivery mechanism. And so, but microforms were 'cos you can make a negative and then make money if you only sell ten copies. And that suited the academic environment perfectly. By the mid eighties microforms for the publisher, let alone the user, had become a pretty boring and limited publishing medium. When the CD-ROM came along it looked enormously attractive in being able to do so much that the microfilm had never been able to do, but equally it was glamorous. It was glamorous to both the publisher and to the user. And the economics weren't that different. You still made a master which wasn't incredibly expensive to make, and then made relatively small numbers of copies. And then here we are a year later, or a few years later but a year ago, with our CD-ROM sales declining because libraries are saying "We do not want CD-ROM," so we say to them "What do you want?" "We want it delivered on-line." "Ah, thank God for that. There's another way we can do it, which is actually even cheaper in some ways." But then what is different between, I think what we're doing now and what we've ever done before is that actually the Internet - it could be any on-line system, but the Internet particularly lends itself to this - offers truly new and creative ways of publishing, ways of linking information together. Which set it apart from anything else I've certainly ever been involved with.

The company's prime business was the publishing idea, but Charles was fascinated by the possibilities created by electronic media. He claimed he was not someone who had fallen in love with the technology and the main activities in which the company was involved confirm this. Staff were busy coding complex literary texts or discussing demanding literary works with academics. When asked what features constituted a "Chadwyck-Healey" person, high up on Charles' list was a need not to be overwhelmed by or uninterested in academic ideas. Other staff confirmed their orientation to these academic or publishing ideals. But there was nevertheless an underlying interest and excitement about carrying out traditional publishing activities in a complex technological way, particularly when, as with CD-ROM and even more with on-line delivery, such methods opened up possibilities unavailable to the traditional forms, for example, using hypertext links between different texts and integrating textual analysis into the text itself.

The culture at Chadwyck-Healey was therefore a professional one based around the conventions of academic publishing but with an unconventional (in publishing terms) concentration and enthusiasm for electronic media. Relationships were flat, staff had a degree of autonomy, though that had not always been the case, and there was an expectation that relationships and job functions must be viewed as flexible in the light of potential changes in the company's market. Staff believed that their ideas and suggestions would be taken seriously. Underlying this, the focus of the company was interpreted as the search for new ideas and new projects. Charles Chadwyck-Healey remained at the heart of the company as the primary source of new ideas and its respected Chairman. He had moved away from a deeply autocratic style which he operated in the early years of the company, though he continued to adopt elements of that approach. Routines were reproduced and modified in this culture with the underlying focus on the search for new product areas infiltrating all that was done.

7.3 Agency, Structure and Routines at Chadwyck-Healey

Agency

The primary agent in the company was Charles Chadwyck-Healey. His influence was enormous. He had responded to the environment in which the company was placed and had used his influence in different ways, first as the prime mover and more recently as a relatively hands-off Chairman. Of the four companies studied in this project, Charles' centrality as a key agent is the strongest. Peter Dawe, whilst both more involved in the day-to-day operation and more aggressively influential in the detail of Unipalm-Pipex, did not have the (relatively) unchallenged control of Charles. Charles' influence came from the same source as Dawe - he was the company founder and was highly knowledgeable and skilled at spotting market changes, just like Dawe - but the company had a much longer history and Charles clearly had the respect of his staff so that his influence could be brought to bear in barely perceptible ways.

The company's style of working closely matched the configuration Mintzberg describes as professional (Mintzberg 1989). Individuals are highly skilled and work largely independently and autonomously. Project-based firms are typical of such configurations. The staff interviewed were, in that sense, important agents in their own fields. Each brought a particular expertise which was respected by other staff.

Structures and routines

Internally the company structure reflected its professional approach. It was open and flat with autonomous departments. Externally Chadwyck-Healey saw itself as operating in a particular niche. It concentrated on academic texts which did not have mass market appeal. Charles and Duncan Christelow (the UK and Eire Sales Manager) both commented at different times that major corporations who might potentially become involved in the niche were unlikely to do so. This particularly affected Charles when he was reflecting on the strategic positioning of the company. Microsoft, for example, would not see Chadwyck-Healey's success in delivering academic texts through the internet as threatening to its business, nor probably as an area ripe for profitable take-over, simply because this form of academic publishing is so specialised. The company did not operate in an atmosphere of threat from other players in the market, therefore. There was uncertainty and threat in questions about whether it could earn sufficient revenue from a specialised niche, and what it must do to maintain the interest of its customers, but relatively little concern with other companies supplying similar products.

The company operated in its market place largely through networks. In this respect its routines had similarities with the National Extension College, which is also involved in publishing, and there is probably an element of industry recipe implicit in this style of working. In its production activities too networks and close, relatively informal relationships, had become increasingly noticeable. The networks were tightly intermeshed and not just a loose collection of relationships. Stephen Pocock described the way in which his complex conversion processes were managed and how decisions taken in-house were now shifting to suppliers:

"We would define that, the way in which the data's to be tagged. But there's the initial editorial work of defining the tag set and doing the data analysis, but then there's the sort of ongoing editorial process of every time you get an actual real instance of the data and compare it against your ideal specification you find the two never quite marry up. So there are some editorial decisions to be made on the fly, as it were. Is this an argument, is it an epigraph, is it a note or whatever. Increasingly we are relying upon the keyer to make those sort of decisions, although we still guide them, we have an editorial team that's essentially what the data conversion team do is mark up text to guide the keyers. But that's where we are currently experiencing the sort of growth of the symbiotic relationship with us as publishers and keyers as data providers. They can do more, take on more and more of that"

Stephen was concerned that the company did not become too reliant on suppliers. He recognised the down-side of the "growth of the symbiotic relationship". The

keying-in of texts - transforming them from written to electronic form - was substantially sub-contracted. Chadwyck-Healey staff carried out complex editorial functions. They stated the precise way in which different conventions in the relevant literature were to be defined and therefore the way in which the structure of the piece would be interpreted - "defining the tag set". But the basic keying was carried out in the Asia, and increasingly, as Stephen indicates in the quotation, editorial functions were carried on there too. The relationship with these supplier companies was relatively informal (there were no formal contracts beyond single requests for purchase of services) even though the Asian company depended heavily upon them, and in at least one case they depended on the Asian company. Initially Stephen used agents in the UK to maintain contact with the supplier companies. Later he developed his own relationships with them, and increasingly day-to-day negotiations were carried on by his staff with their equivalents in the companies concerned, through telephone, fax and e-mail. The use of such networks enabled the company to maintain a strategic fit with its suppliers - the styles of working in the companies were broadly aligned - and was a source of flexibility when products changed. Stephen was concerned to ensure that the company did not become heavily dependent on one supplier but his relationships with the companies were relaxed and personal. It was clear that the boundaries between suppliers and the company were becoming blurred as the suppliers took on work which had previously been carried out in-house and relationships became more relaxed and interconnected. Thus operational routines had evolved and felt comfortable. These practices had implications for strategic routines as will be explored later.

Similar findings have been reported in other organizations which operate with a networked, international division of labour of this kind (Ngwenyama 1998). The relationships tend to become more informal and more trusting. Such developments were not surprising, therefore, and arose partly through the richer communication possible with the new electronic communication technologies.

Networks also formed vital parts of the company's sales operation. Duncan Christelow and his colleagues maintained relationships with major academic libraries and individual librarians but they also develop relationships with individual academics. The academics, as library users, needed to be convinced that Chadwyck-Healey's electronic products met their needs and the libraries needed to be convinced that they were worth purchasing. There were many people involved but this was not a mass market. Relationships were developed at conferences, recently through e-mail networks as well as by personal contact.

The relationship is one of “voice” to use Hirschman’s term not “exit” (Hirschman, 1970). The simple distinction between exit and voice can be helpful. In a dynamic context voice becomes an increasingly important feature, as firms listen to their customers and try to retain their custom. Voice is the exercise of complaints or comments by customers, who may well wish to remain with the company but want it to perform differently. This is particularly significant in sectors where repeat or continuing business form a major consideration. Exit, the conventional market behaviour (in neo-classical economics) of taking business elsewhere, may be an undesirable outcome for both buyers and sellers. In distinguishing between these two forms of market operation the socially constructed nature of markets is demonstrated. In practice, as Hirschman points out, markets are different. The market for Nigerian railways (to use Hirschman’s example) is different from the market for schools. Markets are even defined differently in legal terms. The obligations of buyers and sellers in the housing market are legally different from the obligations of buyers and sellers of vegetables. In interpreting markets and developing routines with respect to suppliers and customers, the possibilities for exit and voice will form part of firms’ strategies. A firm may use different strategies in different parts of its operation. The possibility of exercising voice - perhaps through electronic communications - may be one of the considerations for the firm in defining the permeability of its boundaries with respect to other firms and the extent to which it attempts to police those boundaries, and there is an example of that here: the users of Chadwyck-Healey’s products frequently discussed their needs with the company and commented when things are not as they would wish. They did not transfer immediately to alternative suppliers. This was an approach which the company encouraged. It had parallels with the approach to production. Relationships were personal and flexible - “voice” - not simple market exchanges.

As an example of the evolving nature of this kind of network, Duncan Christelow talked of the need to visit customers largely out of courtesy and then made an interesting comment on the changes e-mail usage had brought:

“E-mail and Internet are becoming more important for us. I mean I tend to do a lot of my communication with customers now by E-mail. I think actually that’s led to an improvement in communications from my point of view. ‘Cos academics and librarians are very happy to use E-mail. Particularly at this time of year, you know the first few weeks of a new term the library in the university is pretty chaotic. It’s not really a time when you can phone the librarian up and expect a relaxed conversation.”

And he continued later:

“I think that’s a very useful way of doing it. And also another example would be I read about it, the announcement of a one day seminar on a particular date, from a librarian in a university in the

UK, and he mentioned in the agenda for the seminar that he might be looking at some sources of information in a particular subject field and mentioned one of our products, so I E-mailed him and asked him if he'd like to have a copy of that, he was very grateful. I think that was kind of marketing that we might be able to do with that. I don't think anybody. So if we keep our eye on what's going on. Again, that was an example where I was attempting to, not pressurise him into buying something, but offer something which he thought might be beneficial to his seminar, and that we would benefit from because he would be promoting our product."

Thus Duncan's use of networks and the way in which he has used e-mail to extend his opportunities reflect a developing set of personal relationships in which the particular requirements of the customer are taken seriously. Similarly at a strategic level, visiting contacts in libraries throughout the world has an important part of strategy formation, as well as attendance at conferences and the maintenance of other networks. At this level the activity was undertaken primarily by Charles. The company has small subsidiaries in Europe and North America which also formed part of the information-generating network.

A primary routine at both strategic and operational levels is thus the use of networks and the development of personal relationships in all the company's activities. Other routines interacted with this broad orientation, however. Whilst networking was a preferred and common pattern of working, and there was a tendency in the company to adopt that approach, it was sometimes challenged. The *Lion* story goes on to explore the interactions of routines at Chadwyck-Healey. The development of routines can best be illustrated by considering a particular set of manifestations of them. The *Lion* story explores a period of significant change in the company's history. In managing this change many of the more implicit aspects of the company's behaviour were revealed and its examination enables us to acquire a clearer and more subtle understanding of routines at Chadwyck-Healey.

The *Lion* story reveals that the use of networks was not the only element of the strategic routine. It was a preferred orientation and was closely aligned with the operational practices of the company. The existence of such practices was of substantial assistance in developing *Lion*. But in incorporating change, networks and their associated practices did not appear to be sufficient.

The Lion Story

During the fieldwork, Chadwyck-Healey moved from being a publisher providing its product on CD-ROMs to one which delivered on-line. It still produced CDs but the future of the company was seen to lie in on-line delivery. This was a major shift. It involved accommodations with, and developments in, company routines and illustrates the way in which the company searched (in the Nelson and Winter (1982) sense) for effective routines and learned from its environment.

The idea was first mooted as a “virtual library” in the middle of 1995. It appeared fully-fledged in its current form as “Literature on Line” (*Lion*) in December 1996.

It was first brought to my attention in the early Autumn of 1995. Stephen Pocock explained that the basic idea had arisen from arrangements that had been in place for some time with a number of American universities. Basically, they had not purchased Chadwyck-Healey’s databases on CD-ROM but had bought the data and put it on to their own electronic servers so that their users could access the material directly on personal computers throughout the university. Chadwyck-Healey therefore began to consider seriously the idea of providing client-server versions of their products. This was tied in with the idea of creating what Stephen called an “old cliché”, the virtual library of data: once there is a client server system in place for databases, then the question of searching simultaneously across more than one database is raised. Chadwyck-Healey were therefore looking at ways of harmonising data structures so that people would be able to search across various databases together and for ways of tying that in to other information sources.

I asked where the virtual library idea came from:

Stephen Pocock: Charles.

Interviewer: Just a bright idea one day or?

Stephen: Yes. Exactly was.

Int: What’s your view on it?

Stephen: I have to say I think he wanted to run before we could walk a bit. The virtual library sort of pre-dated the file server versions of the databases. My feeling was that we were developed, we were moving in that, or we would have moved in that direction anyway, Charles has simply wanted to accelerate the process and still wants to accelerate the process. And is pushing us all to run faster as a result. I’m concerned that we might have gone too fast but.

Int: The idea’s OK?

Stephen: The idea's excellent. Charles's concept of what is achievable, I think is a bit optimistic but then that's what he's there for. And we may well end up achieving 90% of what he thinks we can achieve.....

Having been alerted to the “virtual library”, I picked it up in a conversation I had later with Duncan Christelow. At this time the idea was one of many I had heard circulating in the company. It had some push behind it but I did not see it, at that time, as something enormously significant.

Duncan's view was that most users had become less concerned with the medium of delivery, and that they were considering the use of databases obtained via some sort of on-line link. This was driven partly by the increasing use in libraries of the internet as an information source. He was therefore confirming the viability of the project idea but knew very little about it. Duncan had a broad grasp of the project, but at that time, having spent some time discussing matters relating to the Editorial Department, I knew more of the detail than he did. The project was clearly not at the forefront of staff minds.

A more pressing issue for the Sales Department was the sale of the Chadwyck-Healey databases to a national consortium in the UK (CHEST) which in turn made them available to all UK universities. This has relevance for *Lion*, as will become clear, but at that time was viewed as an entirely separate issue. In the Autumn of 1995, there seemed to be little connection between the two projects. The CHEST deal concerned Duncan since it changed his market place substantially. It meant that all universities in the consortium now had access to Chadwyck-Healey's products simply through their membership of the CHEST consortium. Since a major part of Duncan's market lay with the universities, this had major consequences for the way in which he carried out his job.

There was also a complicating factor that a number of universities had made individual purchases of the databases from Chadwyck-Healey, for thousands of pounds, and felt cheated because the databases were now available simply by joining CHEST. At a different time, I saw some of the correspondence from the Vice-Chancellor of one university to Charles Chadwyck-Healey and it was clear that this was seen as a significant issue of trust and fairness by the Vice-Chancellor. The fact that the Vice-Chancellor had chosen to write confirms the “voice” nature of Chadwyck-Healey's market place.

In terms of explaining the company's move to *Lion*, the two developments are connected. CHEST changed the company's perception of part of its market. Selling databases to consortia, for the members of the consortia to use as they saw fit, alongside the American experience of client-servers, was an indication that the market for individual sales of expensive CD-ROMs might not be robust. There were implications for the kinds of approaches which could be made to the market and the kind of expectations they would have of the company. As Duncan put it:

".....So basically what we've done is we've just sold, instead of selling the data fifty or a hundred times we've sold it once."

Within that short phrase there are many implications for the company. It began to see its market differently. Its interpretation of its obligations to its customers changed. It sold products on the basis of the products' content and value to the customer. On this occasion it then negotiated very different sales arrangements which were a much better deal for the customer than those initially constructed. CHEST was not easy for the company. Expectations of universities that they would always be treated well were challenged, not because they were treated badly, but because they paid out large sums for something which would have been unnecessary had they had more information about possible future relationships. Sales staff were not accused of double-dealing but their customers became more wary of the precise terms of sale. The networks which had been carefully nurtured were threatened by this shift of approach and I understand Chadwyck-Healey did make some compensation payments, though there was no legal obligation to do so, in order to maintain good relationships with customers.

Thus although the CHEST arrangements were largely separate from what eventually became *Lion*, the way in which they began to open up different interpretations of the market help to account for the later developments. Agents' perceptions changed and the structures of the market shifted.

In the meantime, Charles was developing the idea of the virtual library. A new Editorial Director had recently been appointed, partly to bring more creative ideas in to the company and he and Charles had been spending a lot of time acquiring rights to other works and setting things up. I asked Charles where the idea for *Lion* came from:

"Interestingly it did just come as a kind of, I suddenly had a vision of the whole thing sitting on a plane going to Australia in April. My wife and I were going for a three week holiday. I'd taken a few articles relating to work with me to read on the plane. We'd worked very hard, worked very hard to get ready for this trip, and I think in a strange way you get on to the plane, you're cocooned for 24 hours or whatever it is, 20 hours, and you suddenly realise you can relax. And your mind begins to work in a different way, and I read something in one of these articles which just triggered off a complete new line of thought about how the fact that we had made no attempt to link all our databases together, and if we linked them together why shouldn't they be linked to other people's databases? And quite honestly the whole thing certainly evolved in my mind in five minutes. It was just, it was suddenly so obvious I couldn't think why we'd never thought about it before."

This is an extreme example of the way in which Charles came up with ideas for the company, but it is not untypical of the kind of behaviour which those interviewed expected. His excitement about the idea related to the opportunities presented by building links into databases. At that time his thoughts were less developed than they became subsequently but one can see the foundations of the new project.

We should now travel on in time to December 1996 and look back at the trajectory of the project and what had to be done to make it work. In mid 1995 it was clear that company approaches were shifting as the company learned about its new environment. Six months later, in January 1996 the project had been accepted and understood by staff but it had not been incorporated into day-to-day activity. Charles described his realisation of this:

Charles Chadwyck-Healey: But I came back from Christmas break, had a board meeting and we were discussing, by this time we were discussing our production plan for the coming year in enormous detail, down to the tiniest, most insignificant little CD-ROM. The one thing missing from the whole plan was our literature web site. And I realised that it had got, it had really been overlooked because it didn't fit a slot. It wasn't being looked on as a product.....I realised that we weren't, there was something we weren't doing right, 'cos here we had great idea, we'd already decided months before that it was probably the most important thing the company should be doing, and yet we weren't doing it. And to me that's a fascinating management challenge. What happens to ideas? Why do well intentioned, hardworking people fail to do what is quite clear that they should be doing? Well one of the ways to break these log jams is for somebody to lose their temper, which is virtually what happened on this occasion.

Interviewer: Who lost their temper?

Charles: I did. And I, Alison said that she couldn't do it, no, she thought that she could possibly do it by spring '97. This is January '96. And I said that that just felt too long to me, that I felt we were going to be overtaken by events. And that the first week in December '96 should be the target

date. I went off to Russia the next day, for a few days, and I came back a week later or so. Steve Hall and Alison, Steve Hall had really pulled everybody together and had got a plan going. He bought some very good planning software, I can't remember what it's called, and we delivered what is, I believe, one of the most sophisticated uses of the web and it's certainly user friendly, works beautifully, incredibly solid, incredibly large and we delivered it this week, last week, first week of December. So that was a real triumph, actually. But it was because everybody got together, became totally focused, drew up a, you know, a work-flow, a chart that really was done properly, and it recognised all the key steps and then stuck to it. And, you know, we do have the production depth here to actually know how to do the thing anyway.

A good deal happened between Charles losing his temper and the delivery of *Lion*. The directors had suggested setting up a committee to assess the needs of *Lion*. But no one person was able to take responsibility. At that time the company did not have a Managing Director. There were four directors, each responsible for a different part of the company, reflecting the professional model to which they implicitly ascribed, and a chairman (Charles) who did not have a line management role and was, in his own words "in and out, disappear for weeks at a time, not be particularly close to day to day work and development, kind of throwing ideas into the pot". The previous Managing Director, who had left some time before, had not been replaced but now there was a sense of a vacuum. Charles had a sense of dissatisfaction and impatience that something was missing. He felt the company had got bogged down and things were not advancing in the way that they should. The company had been having weak trading results which also contributed to the dissatisfaction. In February another very stormy and difficult meeting took place in San Antonio, Texas, one of a regular three-monthly Heads of Companies meetings, when the heads of all parts of the Chadwyck-Healey group get together. The meeting discussed the weakening sales position in Europe and problems with the American company as well as new product strategies. Charles claimed he had enjoyed all three days of the meeting but the next day he drove to Houston with Steve Hall, then the Director of Sales, and was told that by the end of the third day all the directors were ready to resign. Whether all the directors felt so strongly is not clear but it is undoubtedly the case that there was a great deal of unrest. The outcome was that in April, Steve Hall was made Managing Director.

Here then we had a good deal of disruption. The company was very open in its relationships however, and there were opportunities to discuss, argue and learn from the dissatisfaction, for example at the Heads of Companies meetings. Matters did not become undiscussable (Argyris 1976), so that Steve Hall felt able to raise his perceptions of the difficulties with Charles. I was not able to speak to Steve Hall

but conversations with other staff confirmed the openness of relationships. In this case new structures were created from self-conscious reflections on previous structures by senior staff and as a result of the behaviour exhibited by those staff. This was both enabling behaviour - Steve Hall's pulling together of the team - and constraining behaviour - the reluctance of others to move quickly. The search for new structures produced modified routines, for example, in redefining the idea of a project so that *Lion* was seen as, in some senses, equivalent to existing CD-ROM projects. There were other modifications too, discussed below. But these were not wholesale changes in character. The search was driven by discomfort and dissatisfaction and the new structures were created by the recursive interaction of existing structures, within the company and market, and agents (the Directors - Steve Hall and Charles in particular plus other influential staff) not by the imposition of a fixed plan or decision to change. The trust and confidence of all staff was an important part of the company's ability to flex in this way.

Operational changes

At an operational level there were a number of significant changes required to facilitate the shift to on-line distribution. Charles was proud of the company's financial conservatism but the move to *Lion* had to be financed, and existing conservative operational routines were insufficient:

Interviewer: And that's also a change. I know you're borrowing, you're not going to the Stock Exchange but you're borrowing against assets which.

Charles Chadwyck-Healey: We've probably borrowed already just about as much as we can, because the other big thing in '96 we did a complete refinancing with Coutts, but I would consider selling equity at this stage.

Int: You would?

Charles: Yes. Which I certainly never have been prepared to do before. But because we have other interests in other companies in the US it's more likely that we would sell those interests to raise money. And in fact some of that is possibly quite imminent.

My surprise at Charles' acceptance of the possibility of outside equity finance is clear from the quotation. For Charles, *Lion* clearly represented an enormously important change. He described it as a huge change for the company. The new willingness to consider equity finance, gave clear signals about the size of the task. On the financial side of the company, Alistair Laidlaw recognised that moving products to delivery by the internet was a risky venture and that companies which were not privately owned might not have been prepared to take that risk. He

showed an element of pride in the company in making such an assessment. He was not concerned about the refinancing of the company. Given the company's growth and profitability, he was surprised it had not been done before, and whilst it was clearly a shift in company style, the move to properly secured loan finance did not seem extravagant. It was a continuation of existing policies. The existing conservative financial routine was being translated for the needs of the larger company Chadwyck-Healey had become. A move to external equity finance would have been a shock, and would have the potential to transform the company, but during the fieldwork this did not happen.

Financially, then, whilst significant shifts had been contemplated, the company was moving along a track which matched previous behaviour. The financial operational routine was being modified and new possibilities were emerging but there had not been disruption and wholesale change.

In sales and production areas the move to on-line delivery had resulted in some profound changes. In both areas staff had become uncertain about their jobs and had sensed that communications within the company had been weaker. The stormy nature of Board meetings and Heads of Companies' meetings had not filtered down but a much higher than normal number of staff had left. The staff interviewed, none of whom left, unlike Unipalm-Pipex, explained the higher than usual loss of staff as a function of the size of the company (Duncan), age-related and because pay and conditions had dropped below industry standards (Stephen) and believed the problem had been resolved by the introduction of a more formal personnel function. The potential need for a clearer focus for personnel policies and practices as the company grew had been commented on earlier by a number of respondents. It is typical of the company that it moved relatively quickly to put such features in place and it matches the pattern of other changes: the promotion of Steve Hall to MD, the continuation of conservative financial practices in new contexts and here the greater formalisation of personnel functions; evolutionary changes not quantum leaps.

Externally, the developing relationship with suppliers, referred to earlier, enabled elements of dislocation to be managed without major disruption through the strategic fit of routines between the company and its suppliers. Stephen Pocock was aware that activities like *Lion* would require less use of some data conversion processes. The keying companies were potentially required less, for example, because more data would be transferred from existing CD-ROM products which were already coded appropriately. The informal relationships developed between Stephen's

section and the companies, rather than contractual commitments, enabled Stephen to manage changes through the trust he had developed in his networks and he had already negotiated reductions in supply from one of the supplying companies.

The company was remarkably non-political. Whilst there were grumbles and complaints about, for example, bonus payments and salary levels, I could find no evidence of significant in-fighting or manoeuvring. But during this period of change more dissatisfaction with processes and direction was evident than had been the case before, for example, the suggestion that a number of directors were ready to resign and the higher number of staff leaving. It was clear that what had previously been taken for granted about the way the company operated, could no longer be completely assumed and this created uncertainty.

In summary, the company was operating with a broad orientation, perhaps reflecting a recipe for specialised publishing companies, which emphasised networks and personal relationships. This worked at strategic and operational levels and was an important part of relationships with suppliers and customers.

The move to *Lion* matched the company mantra, “you’re only as good as your next project”. But it did not fit well initially because the idea of *Lion* did not match the company’s view of what constituted a project. Charles lost his temper - action man with a polite face - in order to force through this change in meanings. He had proposed a major change in product mix, which was part of normal practice, but it had not initially been interpreted as a project by others in the company. It did not match perceptions of projects as, for example, smaller scale, CD ROM ideas (though it is worth noting that CD projects at Chadwyck-Healey were large scale by normal standards. Chadwyck-Healey CDs cost thousands of pounds to purchase, but the new project was orders of magnitude greater than that). Charles acted out some elements of Peter Dawe’s action man. He forced through change at a pace greater than that initially seen as possible by his colleagues. This created disruption and uncertainty within the company.

Whilst I was unable to observe Charles’ version of action man, it is inconceivable that it included the explicitly aggressive and abrasive behaviour found at Unipalm-Pipex. Charles is an urbane, old-Etonian who occasionally, on his own admission, becomes short-tempered. But the underlying motivation was very similar: move fast and take irrevocable steps. In forcing change and pushing senior staff to modify the company’s taken-for-granted way of working, Charles was following a strategic

routine based on the widely-accepted interpretation of the company's world that, "you're only as good as your next project". That phrase is not a routine. It is a shorthand way of capturing the company's shared meaning of its external environment. The routine follows from an acceptance of that interpretation. What was interesting here was that Charles enthusiastically took a leap of faith and demanded that his colleagues redefined an important element of the company's shared meanings: the nature of a project.

Externally there were many similarities with Unipalm-Pipex: the product was new and untested and created a new market. But at Chadwyck-Healey this did not generate aggressive, competitive behaviour.

The company's complementarity in its routine behaviours strategically and operationally, with each enabling and feeding into the others was important. For example, Stephen Pocock revealed the way in which his informal relationships with suppliers were enabling in permitting strategic changes to take place. Long-term contractual agreements would have at least slowed down changes and may have made it impossible for the company to respond to the opportunities it foresaw. His networks, and those of his staff, had not been developed as a result of a deliberate company policy but had been set up in the course of working with the supplier companies and were a feeding through of the taken-for-granted way in which Chadwyck-Healey carried out its business.

The strategic routine at Chadwyck-Healey thus had a number of components. It operated through networks which were aligned closely with operational routines. It evolved. For example, the move to on-line distribution progressed through schemes such as CHEST. It was also based around a focus on the next project which itself had formal and informal components. The main source of new ideas was Charles. Stephen said, "Charles's concept of what is achievable, I think is a bit optimistic but then that's what he's there for...." and this informal role was recognised by all respondents, including Charles. It was partly the recognition of the reliance on Charles that prompted the setting up of a new department to consider new projects. Duncan believed, "Charles's idea of the whole company contributing to new projects is a bit fanciful" but the fact that formal structures were set up to try to harness new ideas captures the emphasis in the company on this aspect of their work. (At the end of the fieldwork the new department was reportedly less successful than had been hoped but that does not diminish the emphasis its creation gives to that aspect

of strategic behaviour.) Finally, but only infrequently, Charles adopted action man tactics to force change when he believed it was being unreasonably resisted.

To understand the sources of these routine behaviours we need to consider finally the role played by technology. It will then be possible to make further comparisons between Chadwyck-Healey and Unipalm-Pipex.

7.4 Technology as a constitutive element

The technology never featured as a major inspiration or company focus at Chadwyck-Healey. The company was dealing with the most up to date technology but as quoted above Charles Chadwyck-Healey claimed, “the delivery technology is not of great interest to us. We always seem to have been using a new technology to escape from a previously unviable situation.” He clearly enjoyed using modern methods. When challenged on the company’s relatively late acquisition of an e-mail system, he pointed out more than once that he had been one of the intrepid users of “Telecom Gold” when the term internet had not been invented.

Electronic mail was implicated in changes in approaches to external agents, as has already been discussed, and in internal structures:

Duncan Christelow: I think it is actually this has been helped a lot by the internal E-mail. Because since that went live information has been provided much more readily. I think there was a tendency, at one stage during the company's, in my time at the company, where information wasn't really filtering through very well and whereas, I mean this goes back to your sort of sales meetings and product information meetings which you might expect to have on a fairly regular basis in a publishing house, but we weren't really getting the information we needed to sell these titles. Now things are improved greatly because, obviously, you get an E-mail message, anything of any interest is posted on a bulletin board about, which is available for each project, so information is much more readily available.

E-mail fitted well with the company’s flat structure and enhanced opportunities to maintain professional autonomy and share information. But the adoption of e-mail was relatively late. In an early conversation with Stephen Pocock he commented that the company was in many respects technologically backward:

Stephen Pocock: If you're asking how important are they [new technologies] internally? That's? That I think has still to be proved, yet. We, despite the fact that we are a relatively high tech operation for a publisher I think internally we operate in a fairly low tech way.

Interviewer: By which you mean no E-mail?

Stephen: By which I mean no E-mail and no connection to networks, not even a PC necessarily on everyone's desk.....

E-mail was widely and readily adopted (during the time of the fieldwork) and improved communication flows. The company was conservative about taking up some of the opportunities provided by e-mail however. For example, there were no significant moves to homeworking even though this is compatible with the method of working and relative autonomy particularly of staff in Sales, and some staff had suggested homeworking and the use of appropriate technology as a desirable option but it had not been taken further.

The company did not focus on technology nor relish it. Stephen Pocock's concentration in his work, as quoted earlier, was that "the intellectual input is one of data analysis rather than content analysis. Structure rather than content is important." He was concerned with the complexity of the written word, not with the technology which enabled him to reveal it in certain ways. Similarly Duncan Christelow used e-mail to maintain networks which he might otherwise have managed in other ways. He found opportunities which arose only through the existence of e-mail so that he could get closer to his clients and make unexpected offers to them. But the technology itself was of no interest to him.

This does not mean that the technology was unimportant. Staff at Chadwyck-Healey used technology in different ways, in the manner in which pencils, calculators and typewriters were seen as tools in earlier decades. The technology in this case, however, was implicated in all that was undertaken. Much as at Unipalm-Pipex, if there had been no electronic technologies there would be no Chadwyck-Healey, but at Chadwyck-Healey it was a medium rather than a *raison d'être*. The technology-in-use became part of the social world at Chadwyck-Healey through the interpretations which agents made of it, and the actions which followed from those interpretations. Structural changes in the market arose from the opportunity to buy databases via a consortium, as exemplified by CHEST. The company's boundaries were blurred through the use of e-mail with suppliers and customers.

Chadwyck-Healey is a publisher which also happens to be a high-tech company. It could, with its current product structure and orientation, equally be a high-tech company which happened to be a publisher. The history and culture of the company

makes it the former. Its world is interpreted by staff using a broadly publishing perspective. Operational routines and products, however, are intensely technological. In some senses the technology is constitutive of the company more deeply than at Unipalm-Pipex because it is literally taken-for-granted by the vast majority of staff. It is not of interest but is assumed. And yet without the technology the company's internal and external relationships and products could not have become what they are. As at Unipalm-Pipex the social and technological are practically inseparable.

7.5 Unipalm-Pipex and Chadwyck-Healey: contrast and comparison.

Operational and strategic routines at Chadwyck-Healey were centred on well-developed networks, which formed vital parts of the company's operational style. These were set in a context of continually searching for new project ideas which gave the company a thoughtful, perceptive and self-reflexive appearance, and on the harnessing of the latest information technology within the world of information provision, i.e. publishing. Such self-reflexivity resulted in the adoption of new technologies largely in response to perceived difficulties in existing media. The technology itself was used conservatively, for example, as mentioned above, there was a resistance to homeworking. Financial conservatism was also maintained even when making unprecedented changes in order to develop *Lion*.

The company interpreted itself as a high-quality publisher and operated in a professional publishing style. Charles Chadwyck-Healey occasionally exercised his autocratic powers and adopted many features of Dawe's action man in trying to create a new market.

Both Unipalm-Pipex and Chadwyck-Healey were prime movers, some would argue *the* prime movers, in inventing (at least parts of) their markets and in doing so faced major changes in company orientation. Both operated in conditions of uncertainty in circumstances which were changing rapidly. A key feature for both companies was that they were exploiting the cutting edge of electronic technologies, both in fact dealing with the opportunities provided by the internet. In neither case was the product provided by the company conceptually complex: Unipalm-Pipex connected consumers to a network of cables down which they could send messages; Chadwyck-Healey provided academic texts in such a way that links between them could be traced. Both companies had strong founders. Both adopted the strategic practice: move fast and take irrevocable steps. Why then did they develop in such different ways? What is it that lies behind their different trajectories?

The cultures of the two companies were different. The aggressive, macho, hard-edged interpretations of Unipalm-Pipex differ markedly from the meanings which arise from Chadwyck-Healey's professional, understated and academic culture. The cultures themselves partly derive their meanings from the different industry recipes. At Unipalm-Pipex the recipe, to the extent it can be observed, appears to match a non-conformist, arrogant, slightly wacky representation of the internet. The contrast at Chadwyck-Healey is the jealously-guarded, professional, high-quality publisher recipe. Thus the worlds which the companies use as their primary reference points are different in approach and history.

Company organizational structures were different. Unipalm began as a group of companies designed to spin-off from each other. They were different in orientation and financed by the cash cow provided by the TCP/IP franchise. There was a multi-cultural dimension at Unipalm which became increasingly bitter as Unipalm and Pipex became more established. Unipalm-Pipex was also a public limited company. Chadwyck-Healey, a private limited company, in contrast has moved from product area to product area, retaining elements of micro-forms as it moved into CD-ROMS and retaining much of its CD-ROM work as it moved into on-line distribution. The nature of the product, as against its mode of delivery, has remained broadly constant throughout the life of the company. This has produced a focused company structure in which trust had developed and a set of taken-for-granted ways of doing things - routines - at all levels in the company had become established. The histories of the companies have played a part in the structures they have developed. Chadwyck-Healey has had a relatively long history and has developed relatively slowly until very recently. It has been able to build a structure and way of doing things in a relatively slow and evolutionary way. The contrast at Unipalm-Pipex is dramatic. It had a short and turbulent history. It faced more external change than Chadwyck-Healey, though some of this was driven by the company itself and was not independent of the other explanatory factors. A routine to force change emerged at Unipalm-Pipex but for most of the company's history it was inchoate. Chadwyck-Healey established networks and other professional routines which meshed well together and saw it through significant transformations.

Agency played a part recursively and discursively in these transformations. Both companies had strong-minded, dominant strategic agents, and both had energetic groups of staff who aligned themselves with company goals, to the extent such goals could be discerned. At Unipalm-Pipex agents worked independently and sometimes in opposition to each other. They expressed themselves, at times, aggressively.

Relationships appeared highly-charged. Chadwyck-Healey in contrast gave autonomy to staff but within a clearer sense of the needs and responsibilities of different staff groups. There were greater elements of trust and no discernible backstabbing. It was quite clear from Charles Chadwyck-Healey's own admission and from reflection on the earlier history of the company that he could, and did occasionally, operate in his own version of action man mode. He reflected on this: I quoted him above in relation to the establishment of *Lion*, "... And to me that's a fascinating management challenge. What happens to ideas? Why do well intentioned, hardworking people fail to do what is quite clear that they should be doing? Well one of the ways to break these log jams is for somebody to lose their temper, which is virtually what happened on this occasion." Peter Dawe made similar comments but seemed unable to stand back so much from his actions. In the Unipalm-Pipex case this approach became a dominant one, whereas at Chadwyck-Healey it was less central to the strategic options available.

The evolution of anything is less dramatic when the rate of change is slower and, clearly, the rate of change at the two companies differed. Change could have been sharper at Chadwyck-Healey if the company had not chosen to maintain itself in a relatively narrow niche. Alternatively, Unipalm-Pipex could perhaps have selected a niche market and thus have brought greater calm into its proceedings, though the changing nature of that market during the period of the fieldwork was so high that the niche of, for example, corporate connections which Unipalm-Pipex chose initially, was also itself changing rapidly. The sheer rate of change was an influential factor but the companies themselves were partly responsible for the changes affecting them. The decisions to operate in the external world, in the manner in which each company chose, were themselves dependent on the structural circumstances and agents' activities which prevailed. History, culture and routine behaviour were implicated in the rate of change faced by each company. Unipalm-Pipex then found itself operating in an environment in which other companies were also active, whereas Chadwyck-Healey defined itself as a specialist company with a unique product. Chadwyck-Healey faced competition from other providers of academic texts but the possibility for substitution between products was much more constrained than in the case of Unipalm-Pipex. It was able therefore to gain more day to day control over its environment but unable to grow at the rate of Unipalm-Pipex. The rate of change emerged from factors operating in the different circumstances of the two companies but it was not something which arose independently of their behaviour.

Technology as artefact was remarkably similar. Both companies eventually were centrally concerned with the internet. Technology in use, however, was very different. Unipalm-Pipex was staffed by technologists who defined themselves in terms of the technology. Chadwyck-Healey was staffed by professionals oriented towards publishing who saw the technology as incidental. Technology was clearly implicated in change at the two companies. In some respects the practical use of the technology at Chadwyck-Healey was more sophisticated than Unipalm-Pipex but it was a much less important defining characteristic of the company.

Through the complementarity of its routine behaviours and its self-reflexiveness, Chadwyck-Healey was able to search its environment successfully and to learn from it. Change was (partly) managed rather than dealt with as it happened. Charles Chadwyck-Healey behaved in the same way he had always done, though he had clearly modified his approach to the company over several years through his own self-reflection. Other senior managers such as Steve Hall were able to manipulate the structures to take account of Charles' autocracy and the professional culture. Conservative policies financially, professional networks and an excitement with the potential of new technologies were all implicated in change in an interconnected, recursive way. The cultural emphasis on the next project is a key component, rather than an emphasis on making as much as possible from existing areas. Unipalm created its own market by driving hard and Chadwyck-Healey was very similar. Unipalm's market was under threat in an obvious and omnipresent way. The changes faced by Chadwyck-Healey were less threatening.

Thus, in making a comparison between the two companies we can see how differences in culture, structure and agency, which underlay the practices of the companies, produced different responses in broadly similar circumstances. The consideration of routines and the factors behind them is thus confirmed as a valuable approach in understanding firms' behaviour. Both companies were able to incorporate change into their routine behaviour.

Chapter 8: Conclusions

8.1 Introduction: the contribution of the research

In 1993 James March and Herbert Simon reflected on their classic text, *Organizations*, written more than a third of a century earlier, and suggested that most of what was in the book remained useful. If they were rewriting it in 1993 they would change relatively little, but there would be four broad themes that would be somewhat different:

“(1) we would give more attention to empirical observations as opposed to theoretical speculations; (2) we would place relatively less emphasis on analytically rational, as opposed to rule based, action; (3) we would less often take the premises of decisions as given exogenously; (4) we would accord a greater role to the historical, social, and interpretive contexts of organizations.” (March and Simon 1993, p 302)

The article goes on to discuss managers’ “intuition”, which is defined in such a way as to come very close to Nelson and Winter’s notion of skill. As a result of their reflections, March and Simon suggest that “much of the behaviour we observe in organizations is ‘intuitive’ in the sense that it occurs immediately upon recognition of a situation [and] ... much of the intelligence we observe in organizational action comes not from explicit analysis but from rules.” (March and Simon 1993, p 309-310)

March and Simon’s 1993 insights and themes have been the underlying premises of the research, though I was unaware of their article until late on in the project. The accounts in Chapters 4-7 provide a rich analysis of the nature of routines in the four case-study companies. The categories which are discussed and developed there provide explanations for the behaviour of the four firms and provide new building blocks for the understanding of other firms in different circumstances, emphasising empirical evidence, studying rule-based action and recognising the historical, social and interpretive contexts. The discussion successfully establishes that operational and strategic routines can be identified in each of the companies, and is briefly reviewed in the next section. Changes in them can be explained using a recursive form of analysis.

Routines are defined in this project as established, significant, sanctioned and recurrent practices within organizations. A number of key features of organizations have figured in the analysis.

The discussion has emphasised the relationship between structure and agency, drawing on the firms' culture and producing particular routines. Routines are seen as practices built on the meanings defined in the culture and this distinction between practice and meaning has been central. Structures are identified as rules and relationships. Relationships are economic and organizational and connected with the position of agents. The analysis of agency focused on the position of the agent, in particular strategic agency, and skill. The desire to reduce uncertainty, the need for ontological security, has also been important.

Technology is implicated in the changes analysed. The technology under consideration has been primarily electronic and has usually been associated with the provision or analysis of information. The term which has been used to capture the importance of technology in the cases discussed is that it is (partly) *constitutive* of the firms, that is to say that it has the power to enact or establish the firms. It cannot do this on its own but, in interacting with other factors, it has major implications for the structure and routine behaviour of the firms. Furthermore, the implications of this argument are that the other factors on their own, working without technology, would result in a firm which was significantly different from the case observed. This is not the result which was expected at the outset of the research. My sense of the relevant interactions was that technology was likely to come out of the analysis as a tool which had implications for the behaviour of the firm only to the extent to which human agency gave it power. The cases set out in the previous chapters suggest that technology has implications for human agency which go beyond the initial intentions of the agents. Technology is not, however, determining but interacts with the other factors identified in a recursive way and cannot be adequately analysed outside the social system of which it is a part.

The primary contribution of the research is the development of a broader concept of routine as a tool for organizational analysis, in particular, the identification of routine practices at a strategic level and the demonstration that such practices can incorporate change.

In addition, the analysis has more clearly identified the role of technology. It has added to the understanding of routines more generally; routine practices are widely diffused and not simply automatic or low level. Finally it has confirmed that an institutional approach to the understanding of firms' behaviour is fruitful and can add to the current repertoire of approaches in Economics.

8.2 Routines in practice and routines in theory

A brief review of the four case-study companies

At Digital the search for new routines took place when the organization was under competitive threat. Operational routines evolved through mimicking the familiar. Massive practical changes were enacted but their origins went back deeply into previous practices and the interpretations employees made about themselves and the company. Strategic agency and skill were important and technology was deeply implicated.

A new operational routine - flexible working - was developed when the market was changing unfavourably for Digital. The new routine was compatible with the firm's culture about the kind of activities in which it should engage, and became fully embedded in the firm's practices (even though the associated product was withdrawn). Existing rules and other features of structures could be mimicked in order to provide a sense of security, identity and continuity. Staff who suggested new forms of behaviour were in a position in the company which enabled them to influence the agenda about appropriate responses to changes. This influence came about through actions and working practices which were considered appropriate as well as a result of deliberate argument and persuasion.

Technological excellence underpinned all activities practically, in so far as technological fixes were needed to make the system work, and conceptually as the-way-things-are-done at Digital. Understanding the changes at Digital involved a consideration of the factors which were lying behind the surface phenomena.

The NEC case shows that routine behaviour exists at strategic levels. Not all strategic behaviour is routine but, as the case-study demonstrated, many strategic practices are routine and those adopted at the College confined its range of strategic behaviour to a relatively narrow band of options. Networking was the way in which the College interacted with its environment but there were tensions arising from the subtly different ways in which the College's culture interpreted, particularly, internal events. Networking, as a primary practice, evolved partly from these tensions and, in a path dependent way, from the history of the College.

At the NEC the importance of cultural symbols, in particular the College's main building, was identified. Strategic agency was shown to be heavily implicated in change and the financial imperatives faced by the College were formative.

The College was relatively unsophisticated in its use of technology, in comparison with the other case-study companies, but it was clear that the new information system was implicated in the changes taking place. Technology was partly constitutive of the practices adopted. It did not imbue every aspect of the College's work as at Digital and Unipalm-Pipex, but despite the claims to the contrary, the challenges to taken-for-granted practices associated with the new information system did change the environment in some unintended ways.

Unipalm-Pipex had secure operational routines. The strategic routine was manifested in ways which imitated characteristics of the company's founder and the surface illustrations of this, such as action man, were compelling, but the activities underlying the surface behaviour were more important. They involved dropping old products, taking up new product areas speedily and irrevocably, and incorporating change by taking it as the norm, such that ultimately the expectation of change became institutionalised.

Technology was deeply implicated in the way in which staff made sense of the company and themselves. Operational routines embedded in the technology and linked to standard patterns of distribution were ultimately adopted throughout the company. The operational activities of the company were securely tied into the electronic systems the company used and there was a reassuring predictability about them. The strategic routine at Unipalm-Pipex was a fast moving, aggressive response based upon an immediate assessment of the relevant circumstances and a belief that it was important to move faster than the competition. The company continually took decisions which redefined the environment and moved into unknown, and unknowable, territory. The company hung together through the co-operation of, and competition between, its members, running all the time to survive by staying ahead of the rest of the market.

Change was important at Chadwyck-Healey. Operational and strategic routines there were centred on well-developed networks. These were set in a context of continually searching for new project ideas which gave the company a thoughtful, perceptive and self-reflexive appearance, and on the harnessing of the latest information technology within the world of information provision. The company was

defined by its founder and by its staff as a publisher and this was an important feature in the practices undertaken. The history of the company shows how it evolved relatively slowly with strategic agency and technology implicated in the speed and direction of change.

The strategic routine was a form of networking and individual contact through a professional culture. Voice rather than exit typified the company's market. Strategic practices were based in a search for new project ideas in which the pace of change was sometimes forced by the company chairman. He adopted the strategic practice: move fast and take irrevocable steps, in ways which had resonances with the strategy followed at Unipalm-Pipex.

Routine practices

Routine behaviour was thus evident in all the companies studied. It *evolved* through the interaction of a range of factors. For example at the NEC and Unipalm-Pipex there were cultural differences within the companies which partly generated changes. At Digital the differences between local and national understandings similarly generated change. In all the companies the strategic agents played a significant part and interacted in a recursive way with the structures in which they found themselves. *The established, significant, sanctioned and recurrent practices identified depended on culture, history and the interaction of structure and agency.*

In each case the *search* for new activities and routines occurred when threats were perceived. At Digital the threat was obvious and omnipresent during the fieldwork. The search for new practices then came up with teleworking as a partial solution and we have seen how the different factors interacted to bring this about. The National Extension College operated under a continuous sense of financial stringency until near the end of the fieldwork period. Ros Morpeth was profoundly aware of this and the decision to invest in a new information system was taken partly to maintain the College's effectiveness in a relatively hostile world. The symbolism of the building as a secure home was explicitly recognised by Ros. Unipalm-Pipex was fuelled by a fear of failure. The merger of the two sides of the company was driven partly by fear as well as by a strong belief in the potential of the internet. Finally Chadwyck-Healey described its moves into new electronic technologies as a way out of an approach which was becoming unviable. As at Unipalm-Pipex the changes were built also on a belief in the potential of new options. In both Unipalm-Pipex and Chadwyck-Healey there were clear examples of the companies enacting their own environments and thus partly creating the threats which were used to justify change.

Threat is an important stimulus in overcoming the security of an established routine. *Fear or threat can thus be seen as a significant factor in the evolution of routine behaviour.*

Searching involved attempts to find new activities or products as well as new ways of working. So that, for example, at Chadwyck-Healey a new department whose purpose was to assess and generate new ideas was formally established. This built on existing practices in trying to find new products, perhaps to be produced in new ways. At Digital conversely, the new practices were established but the associated product was abandoned. The reasons for these similarities and differences, as we have seen, lie in the culture, history and structures of the different companies, as well as the particular agents involved and their structural positions and skills. The new activities and products evolved from those already in existence. There were no examples of a radical break which had no roots in previous practice though, on the surface, changes such as teleworking at Digital, the *Lion* project and Pipex *Dial* appeared dramatic. *New practices were built on, or evolved from, pre-existing practices.*

I have argued that technology was partly constitutive of all the companies. This may be a particularly marked feature of information systems insofar as those systems are directly implicated in the flow of information, the opportunities available for acquiring knowledge, the codification of that knowledge and its reproduction and storage. Information technology affects shared meanings since it is directly implicated in passing on some of those meanings in its day to day work. Each of the companies discussed what should be done about particular issues, for example, using their electronic systems in different ways depending on their organizational structures, technological sophistication and the role of the relevant agents. Thus the electronic technologies were interpreted and used differently according to the particular circumstances of the firm. Whilst it can be argued from this project that electronic systems, focused largely around information distribution and analysis, are partly constitutive of the firm, it does not follow that other technologies are similarly constitutive and research into other technologies in other firms is needed to establish the implications of them. *The analysis has shown that the implications of the technology studied here can be adequately understood only in the context of the organizational and social system in which it operates.*

In the cases outlined here there were clear differences in the way in which technology was perceived and conceived. At DEC and Unipalm-Pipex it was a

fundamental part of the firm's world and conceiving new technologies or new ways of using old technologies was part of normal business. At NEC and Chadwyck-Healey it was less central, though both companies were in the "information business", and, in those two companies, a good deal of effort was put into conceiving new ways in which electronic technologies could contribute to the firm's work. *In relatively non-technologically focused companies, whilst the technology was not such a central defining feature of people's lives, it was nevertheless heavily implicated in what they did and how they did it.*

At this level of description the routines in the different firms have similarities. The precise events and interactions are different but the motivating factors are similar and reproduction arises from the interaction of agency and structure using particular technologies in a particular context. *It was clear that human systems changed through their interaction with technology though some of that change was unintended.*

Routines clearly existed on some occasions as an ontological security device for individuals, as a means of coping with uncertainty. This was illustrated by Rita Bond's unhappiness with the changes the new IS made to her life at the NEC and by the mimicking of old systems which went on at Digital. Routines were also used as a means of controlling repeated processes and achieving regularity. Thus the well-defined operational routines at Unipalm-Pipex provided the secure base from which it could take leaps of faith with new products. Routines were also used defensively. Ros Morpeth, for example described the way she watched the press and followed up leads from job advertisements, or checked developments with her network of contacts in order to protect the NEC. In a different way but with a defensive motivation, it was clear that some employees at NEC were resisting changes to departmental boundaries. *Defensiveness and uncertainty partially determine the development and reproduction of routines.*

Routines at Unipalm-Pipex and Chadwyck-Healey were able to incorporate change, in ways which did not appear to be the case at DEC or NEC, and there were similarities in the way the two companies carried this out. Strong leadership was implicated in these changes. *It is possible to draw a tentative conclusion that the "move fast and take irrevocable steps" routine is particularly suited to working in a (rapidly) changing environment".*

All the firms studied followed routine practices at operational and strategic levels but the nature of the routines differed, and the manifestations of routines differed, according to the circumstances of the firm. It was helpful, however, to make the distinction between routines and cultures. *This distinction provided clarity in: (1) searching for recurrent practices, (2) considering the way in which the practices were interpreted, (3) looking for the rule or habit on which the practices were based and (4) analysing the structure of relationships which promoted or permitted a particular routine to take place.*

Theorising routines

Chapter 2 outlined briefly the distinctions made by Nelson and Winter in their use of routines. Nelson and Winter's short run operating characteristics are broadly comparable with what have been described as operational routines here. Strategic routines are a broader category than simply decisions about the firm's capital stock. Such decisions are strategic but as the evidence here shows routine ways of dealing with strategic issues go beyond investment. Product decisions, such as those at Chadwyck-Healey and Unipalm-Pipex, were heavily routinised too, for example.

Nelson and Winter's concept of routines which seek to modify operating characteristics and their concept of search are harder to identify empirically. Search has taken place in the cases studied but there was no obvious recurrent pattern. Strategic search is probably relatively rare and therefore observable only occasionally during a period of study of this kind. However, the recursive nature of the interactions means that new operating characteristics do not appear to be sought out in a routine way. Rather they evolve through changes which happen in a much more piecemeal fashion. Unipalm-Pipex, Chadwyck-Healey and Digital attempted to establish new operating practices during the research period, indicated through the task force at Unipalm, the establishment of the new creative department at Chadwyck-Healey and the establishment of teleworking at Digital. In all three cases the decision appears to have been relatively formal and not routine, in the sense in which the term is used here. The working through of the decision, the speed and direction of change and the relative success or failure of the decisions, however, have been influenced by pre-existing practices and the extent to which those practices were implicated in the changes. There does not appear to be a search routine as such, but the recursive nature of the evolutionary change which takes place and the occasional formal decision to amend practices means that operational characteristics do change in ways that are both thought through deliberately and taken-for-granted in the interplay of organizational life. To the

extent that the implementation of the new information system at the National Extension College was an attempt to modify operating characteristics, that also matches the pattern described for the other companies. At a conceptual level it can be argued that search and modifications to operating characteristics can be accounted for through the reflexivity of human agents but this is not the same thing as a routine. Some companies were better at promoting reflexive behaviour than others. Their abilities arise from the interaction of all the features under consideration with history and associated path dependency a significant contributor. *There do not appear to be direct empirical referents, in this research, for the Nelson and Winter concepts of search and routines concerned with changes in operational characteristics.*

Nelson and Winter's insistence on separating search and routines, whilst recognising the rule-basedness of search and understandable in the context of evolutionary modelling, makes too great a distinction between them. Routines and search strategies cannot be completely distinguished. Strategic routines are themselves partly about searching as the networking routines at the NEC and Chadwyck-Healey exemplify.

Strategic and operational routines also influence each other and cannot be entirely separated empirically. This follows from the recursive nature of the relationships involved and was demonstrated most clearly at Chadwyck-Healey where the modifications at a strategic level, required in order to follow through the *Lion* project, were greatly assisted by the routine relationships established with suppliers operationally. Thus we can identify routine practices which are primarily to do with strategy and routine practices which are primarily to do with operational activities. Both have the potential to influence each other. *The relationship between operational and strategic practices is not simply one way - strategy defining operations - as, for example, a Chandler view of strategic change processes would imply - but works in both directions and helps to explain the way in which strategy emerges in organizations.*

A richer social ontology

Routines are difficult to study because they are complex patterns of social action. As discussed in Chapter 2 they have been characterised in the literature as automatic responses and as accomplishments which have to be worked at continually. The evidence here demonstrates that they are quite clearly more than automatic responses and that broadening the use of the term to include effortful

accomplishments throughout organizations helps in explaining organizational behaviour.

The implication of staying with a narrow definition is that any behaviour which is not automatic, or very largely so, is not routine and must therefore be carefully thought through or randomly impulsive. The evidence of the four cases shows that we can reject that construction. Throughout organizations we find behaviour which is taken-for-granted but not automatic. Low level and high level work are both prone to such practices. The behaviour is routine in the sense that it is recurrent, sanctioned, significant and established.

To consider routines as only relatively low level or automatic, or both, makes a distinction in the analysis of taken-for-granted behaviour which is unhelpful. It is reasonable to consider only low level routines, or only automatic responses, but in order to comprehend fully the behaviour of firms it is important to recognise the routineness of practices throughout the firm, and to understand that routineness in itself is not inimical to change, though some routine practices may be.

Using this concept, defined in that way, enriches our social ontology. It emphasises the importance of an institutional understanding of firms' behaviour and gives us the potential for a rich picture giving new light on operational and strategic behaviour and the process of change.

8.3 Future Work

The data which have been used in the research have enabled me to get beneath surface attitudes. By visiting companies approximately every six months over an extensive period, it was possible to build relationships and to develop trust with participants. A broad picture of each company could be acquired through visiting regularly but having time for reflection between visits. Changes to the companies were recognisable because the length of time between visits was sufficient for them to have worked through, to some extent, and I was able to observe change partly because I was taking a regular snapshot rather than absorbing change as it happened. I am confident that the analysis has identified interesting patterns at a relatively high level of generality which reflect the understandings of those who worked in the firms. The patterns may have been unclear to the participants themselves but the combination of different perspectives drawn on over a long period makes those broad conclusions robust.

However, the pattern of the research also meant that it was difficult to study micro-routines in a detailed way. The broad picture emerged but the detail could not be observed for sufficiently long periods to make extensive comments about behaviour at that level. To follow up the detailed working of routines such as teleworking would require a different pattern of observation and would be an interesting development of the research here.

Even with visits every six months it became challenging to keep on top of the work of four companies. The volume of data was almost overwhelming. Studying only two companies but visiting them four times each year would have been an alternative. That would have enabled a more detailed picture of the processes of change to be drawn, whilst still making it possible to sense the broad changes and patterns. However, the contrasts which the study of four companies made possible have been valuable. The differences between the two technology-based firms helped understanding in each of them. I was able to ask myself why changes happened to one but not the other. Similarly the contrasts and similarities between the NEC and Chadwyck-Healey helped in working through the data, and the somewhat unexpected similarities between Unipalm-Pipex and Chadwyck-Healey enabled richer analysis to take place. However a more frequent study of a smaller number of companies, or a larger project, involving several researchers, studying four or more companies more frequently could build on the research. It would be valuable to take companies from different sectors from those studied here. Traditional sectors which also appear to be undergoing rapid change would be particularly interesting, for example, food technologies and food service, agriculture and biotechnology or companies concerned with new materials in engineering or clothing.

It would have been valuable to spend more time in each company, simply hanging around. I made a point of talking to reception staff and personal assistants, particularly at Chadwyck-Healey, but could have factored more of that in to each company as one form of triangulation and perhaps of alternative insights. The use of a diagonal slice of staff worked well but I cannot be completely confident that I was able to pick up the informal interpretations and insights into company culture which would have been possible if I had spent time chatting over coffee or sitting in departments listening to informal banter. A follow-up study involving participant observation for two or three months would add to the richness of the analysis.

At a theoretical level the research has revealed the need to think more about the development of technology as a form of agency. The issue of the materiality of agency needs further exploration. This is a topic which is raising interest within the information systems literature and it may be possible that a reworking of some of the data collected here could contribute to the discussion. It was not an explicit objective of the research questions, however, though in any future work of this kind it would be helpful to include it as part of the objectives.

There are a number of areas in which the work could be extended or approached in a different way.

Routine failure

Two aspects of failure in routine behaviour have not been covered in the current research. Firstly, the failure to develop new routines was not something which could be easily observed with the particular research method adopted, using interviews interspersed with long absences from the firms. It is likely that each of the organizations studied attempted to develop new routines, and failed to do so, but this was not something which any of the companies volunteered. There were comments from respondents from time to time that an alternative approach by one of the companies could perhaps have been tried, or tried more systematically, but the companies did not readily admit to their failures, even to themselves. In the early interviews questions were asked on this topic but it became clear that it was not a fruitful path from the emptiness of respondents' replies. Studying the failure to establish routines could be insightful in developing an understanding of routine behaviour. It would rely on luck - being in the right place at the right time - but my sense from the case-study material here, and from earlier work, is that examples of failure would appear in a study extended over a period of twelve months or possibly less. A different research method using some form of participant observation would be necessary to gain ready access to this kind of failure.

Secondly, there are conceivably routines which are successfully established but which continually produce failure, that is patterns of behaviour which never succeed in achieving the objectives set. Argyris (1976) attempts to understand some aspects of these kinds of practices. A form of participant observation would also be more appropriate for work which attempted to understand practices of this kind. Such practices are, presumably, only sustainable in a benign environment, though Nelson and Winter (1982) argue persuasively that routines as a form of truce can be effective even though they are in some senses sub-optimal.

Knowledge management

The management of knowledge in companies, its storage, distribution, reproduction and transformation is becoming an increasing concern and builds partly on the learning organization literature. Reid and Garnsey (1998), for example discuss these issues with respect to small and medium-sized, high-technology firms. The concept of routine put forward here could contribute to work in that area in its insistence on considering practices at all levels in the organization and the emphasis on the interaction between structure, agency and technology in a particular cultural and historical context. Focusing only on human resource development or on individual learning is inadequate in understanding knowledge management and increasingly technology has to be drawn directly into the analytical framework.

Search

Searching by companies for new ways of working has been discussed in a number of places in this project. It has been argued that search cannot be seen as a separate category of routine but that it is undertaken through self-reflexivity and broader strategic practices as well as being part of routine behaviour. The practices at Chadwyck-Healey seem to adopt a greater number of these features than in the other firms studied. It would be a valuable contribution to uncover the ways in which companies search their internal and external environments and to explore any general characteristics which may be found in their routine behaviour.

Grammars of action

Pentland and Rueter (1994) argue that routines can be better understood if they are considered to be grammars of action. The metaphor of grammar is an attractive one in this context because it allows complex elements of language to be combined together in many different ways whilst retaining an overall structure and regularity. Pentland and Rueter have applied their concepts to what would be called operational routines in this project. An interesting development of the work here would be to attempt to apply Pentland and Rueter's insights to more strategic practices. Such a study would require a different research method because of the need to capture the discourse involved in the routine practices at a detailed level on a day to day basis. The appropriate method would be some form of participant observation, though in keeping with the subject matter of this project, one fruitful area, which is perhaps more readily accessible, might be an analysis of strategic behaviour linked to

information systems and electronic communication. Studies such as that carried out by Ngwengama (1998) could be a helpful stepping-off point.

Change routines

Not all routines successfully incorporate change. It would be fascinating to build on the analysis of Chadwyck-Healey and Unipalm-Pipex to discover those routine practices which appear to be particularly successful in a very fast changing world.

Bibliography

Alchian AA (1950) "Uncertainty, Evolution and Economic Theory", *Journal of Political Economy*, Vol LVIII, pp 211-221.

Altheide DL and JM Johnson (1994) "Criteria for Assessing Interpretive Validity in Qualitative Research", in Denzin NK and YS Lincoln (eds) *Handbook of Qualitative Research*, Sage, London

Andersen ES (1994) *Evolutionary Economics: Post Schumpeterian Contributions*, Pinter Publishers, London

Argyris C (1976) *Increasing Leadership Effectiveness*, John Wiley and Sons, New York.

Baert P (1996) "Realist philosophy of the social sciences and economics: a critique", *Cambridge Journal of Economics*, Vol 20 pp 513-522

Barrie C et al (1997) "WorldCom knocks BT off global expansion line", *Finance Guardian*, Tuesday November 11, p 19

Becker M (1998) "An Empirical Contribution to a Taxonomy of Routines", Unpublished MPhil dissertation, Judge Institute of Management Studies, University of Cambridge.

Bennis W and B Nanus (1985) *Leaders: the strategies for taking charge*, Harper and Row, New York

Bhaskar R (1979) *The Possibility of Naturalism*, Harvester Press, Hemel Hempstead

Blackie J (1970) *Report of an Inspection of the National Extension College*, Cambridge, National Extension College, Cambridge

Boisot M (1987) *Information & Organizations: the manager as anthropologist*, Fontana, London.

Boland RJ (1985) "Phenomenology: a preferred approach to research on information systems", in Mumford E et al (eds) *Research Methods in Information Systems*, North-Holland, New York.

Boland RJ (1996) "Why shared meanings have no place in structuration theory: a reply to Scapens and Macintosh", *Accounting, Organization and Society*, Vol 21, No 7/8, pp 691-697

Boulding KE (1981) "The Basic Evolutionary Model", *Evolutionary Economics*, Sage, Beverly Hills-London, reprinted in Witt U (1993) *Evolutionary Economics*, The International Library of Critical Writings In Economics 25, Edward Elgar, Aldershot.

Bryman A (1989) *Research Methods and Organization Studies*, Unwin Hyman, London.

Chadwyck-Healey (1996) Press Release November 1996, www.chadwyck.co.uk

Chandler AD Jr (1962) *Strategy and Structure: Chapters in the History of Industrial Enterprise*, MIT Press, Cambridge Mass.

Chandler AD Jr (1977) *The Visible Hand: the Managerial Revolution in American Business*, The Belknap Press of Harvard University Press, Cambridge Mass.

Chandler AD Jr (1988) *Scale and Scope*, Harvard University Press, Cambridge Mass.

Child J (1972) "Organizational Structure, Environment and Performance: the Role of Strategic Choice", *Sociology*, vol 6 pp 1-22.

Child J and C Smith (1987) "The context and process of organizational transformation" *Journal of Management Studies* Vol 24 pp 565-594

Cohen MD and P Bacadayan (1994) "Organizational Routines Are Stored as Procedural Memory: Evidence from a Laboratory Study" *Organization Science*, Vol 5, No 4, November, pp 554-568

Costello N (1996) "Learning and Routines in High-Tech SMEs: Analyzing Rich Case Study Material" *Journal of Economic Issues*, Vol XXX, No 2, June, pp 591-597

Cronin MJ (1994) *Doing Business on the Internet*, Van Nostrand Reinhold, New York.

David PA (1985) "Clio and the Economics of QWERTY" *American Economic Review*, Vol 75 No 2, pp 332-337, reprinted in Witt U (1993) *Evolutionary Economics*, The International Library of Critical Writings In Economics 25, Edward Elgar, Aldershot.

De Geus AP (1988) "Planning as Learning", *Harvard Business Review*, March-April, pp 70-74.

de Salvo A (1993) *Kett of Cambridge; An eminent Victorian and his family*, National Extension College, Cambridge.

Digital (1992) *Flexible Work Practices: An Overview*, Digital Equipment Company Ltd., Basingstoke

Digital (1993) *Digital Equipment Corporation, 1993 Annual Report*, Digital Equipment Corporation, Maynard Massachusetts

Digital (1994) *Flexible Working Handbook*, Central PSC, Digital Equipment Company Ltd., Newmarket (unpublished internal document)

Digital (1992) *Flexible Work Practices: An Overview*, Digital Equipment Company Ltd., Basingstoke

Digital (1995) *Digital Brief Guide*, Digital Equipment Corporation., Maynard Massachusetts

Dodgson M (1993) "Organizational learning: a review of some literatures", *Organization Studies*, 14, 375 - 394

Douglas M (1987) *How Institutions Think*, Routledge and Kegan Paul, London.

Du Gay P et al (ed) (1997) *Doing Cultural Studies: The Story of the Sony Walkman*, Sage, London

Duncan R and A Weiss (1979) "Organizational Learning: Implications for Organizational Design", in B Staw (ed), *Research in Organizational Behaviour*, Vol 1, JAI, Greenwich Ct. USA.

Dutton JE (1988) "Understanding strategic agenda building and its implications for managing change", In LR Pondy, RJ Boland Jr and H Thomas (eds) *Managing ambiguity and change*, John Wiley and Sons

Eisenhardt KM (1989) "Building Theories from Case Study Research", *Academy of Management Review*, Vol. 14, No. 4, pp. 532-550.

Fiol CM and MA Lyles (1985) "Organizational Learning", *Academy of Management Review*, Vol 10, No 4, pp 803-813.

Freeman R (1983) *The National Extension College, Cambridge: its aims and development*, Open University, Milton Keynes

Garnsey E (1992) "Towards a Critical Systems Perspective; on constitutive processes in dynamic social systems" Unpublished paper, Management Studies Group, Department of Engineering, University of Cambridge.

Giddens A (1979) *Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis*, Macmillan, London

Giddens A (1982) *Profiles and Critiques in Social Theory*, Macmillan, London.

Giddens A (1984) *The Constitution of Society*, Polity, Cambridge

Giddens A (1990) "Structuration Theory and Sociological Analysis" in Clark J, C Modgil and S Modgil (eds) (1990) *Anthony Giddens: Consensus and Controversy*, Falmer, London

Ginsberg MJ (1979) "A study of the implementation process", in R Doktor, RL Schultz and DP Slevin (eds), *TIMS Studies in the Management Sciences*, Vol 13, North Holland, Amsterdam.

Glaser BG and AL Strauss (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Aldine Publishing Co., Chicago

Grant RM (1991) "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation", *California Management Review*, Spring, pp 114-135

Grinyer PH and J-C Spender (1979) "Recipes, crises and adaptation in mature businesses", *International Studies of Management and Organizations*, Vol IX, No 3, pp 113-133

The Guardian (1996) "UK net loses pioneer", *The Guardian Online*, Thursday May 23

Hall S (1997) "The Work of Representation" in S Hall (ed) (1997) *Representation: Cultural Representations and Signifying Practices*, Sage, London.

Heterick RC et al (1997) "The Public Policy Implications of a Global Learning Infrastructure" A Report from a Joint NLII-SHEEO Symposium, Educom, Denver, Colorado, Nov 13-14

Hari Das T (1983) "Qualitative Research in Organizational Behaviour", *Journal of Management Studies*, Vol. 20, No. 3, pp 301-314.

Hirschman AO (1970) *Exit, Voice and Loyalty*, Harvard University Press, Cambridge Mass.

Hodgson GM (1993) *Economics and Evolution; Bringing life back into Economics*, Polity Press, Cambridge

Hodgson GM (1995) *Economics and Biology*, The International Library of Critical Writings In Economics 50, Edward Elgar, Aldershot.

Hodgson GM (1997) "The ubiquity of habits and rules", *Cambridge Journal of Economics* Vol 21, pp 663-684

Huber GP (1991) "Organizational Learning: the Contributing Processes and the Literatures", *Organizational Science*, vol 2, No 1, pp 88-115.

Hurst DK et al (1989) "Top management teams and organizational renewal", *Strategic Management Journal*, Vol 10 Special, pp 87-106

Janis IL (1985) "Sources of error in strategic decision making" in JH Pennings (ed) (1985) *Organizational Strategy and Change*, Jossey-Bass

Jennings A and W Waller (1995) "Culture: Core Concept Reaffirmed", *Journal of Economic Issues*, Vol. XXIX, No. 2, June, pp.407-418.

Johnson G (1987) *Strategic Change and the Management Process*, Blackwell, Oxford

Johnson G (1988) "Rethinking Incrementalism", *Strategic Management Journal*, vol 9, pp 75-91.

Jones AM and C Hendry (1992) *The Learning Organization: A review of Literature and Practice*, The HRD Partnership, London.

Jones MR (1994) "Organizational learning: collective mind or cognitivist metaphor?", Management Studies Group, Department of Engineering, University of Cambridge, Unpublished paper.

Jones MR (1998a) "Structuration Theory" in Currie WJ and R Galliers (eds) *Rethinking Management Information Systems*, Oxford University Press, Oxford

Jones MR (1998b) "Steering between the Scylla of Embedded Structure and the Charybdis of Strong Symmetry: An Information Systems Odyssey" Judge Institute of Management Studies, University of Cambridge, Unpublished paper

Joshi K (1991) "A model of users' perspectives on change: the case of information systems technology implementation", *MIS Quarterly*, Vol 15, No 2, pp 229-242

Keat R and J Urry (1975) *Social Theory as Science*, Routledge & Kegan Paul, London

Keen PGW (1981) "Informational Systems and Organizational Change", *Communications of the ACM*, Vol 24, No 1, pp 24-33

Kling R and S Iacono (1984) "The control of information systems development after implementation", *Communications of the ACM*, Vol 27, No 12, pp 1218-1226

Kolb DA and AL Frohman (1970) "An organization development approach to consulting", *Sloan Management Review*, Vol 12, pp 51-65

Kotter JP (1985) "Why power and influence issues are at the very core of executive work" in Srivastara (ed) *Executive Power*, Jossey-Bass

Kuhn TS (1970) *The Structure of Scientific Revolutions*, The University of Chicago Press, Chicago

Latour B (1996a) *Aramis or The Love of Technology*, Harvard University Press, Cambridge Mass..

Latour B (1996b) "Social Theory and the Study of Computerized Work Sites" in Orlikowski WJ, Walsham G, Jones MR and DeGross JI (eds) (1996) *Information Technology and Changes in Organizational Work*, Chapman and Hall, London, pp 295-307

Layder D (1987) "Key Issues in Structuration Theory: Some Critical Remarks", *Current Perspectives in Social Theory*, Vol 8, pp 25-46

Lawson T (1997) *Economics and Reality*, Routledge, London

Lewin K (1952) "Group decision and social change", in Newcombe and Hartley (eds), *Readings in Social Psychology*, Holt, New York, pp 273-90

Lewis D (1968) *Convention: A Philosophical Study*, Harvard University Press, Cambridge Mass..

Leydesdorff L and P Van Den Besselaar (eds) (1994) *Evolutionary Economics and Chaos Theory; New Directions in Technology Studies*, Pinter Publishers, London.

Loasby BJ (1991) *Equilibrium and Evolution: An exploration of connecting principles in economics*, Manchester University Press, Manchester.

Lundvall B-a (ed) (1992) *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter Publishers, London.

Lyttinen K and R Hirschheim (1987) "Information systems failures: a survey and classification of the empirical literature", *Oxford Surveys in Information Technology*, 4, 257-309

McCraw TK (ed) (1988) *The Essential Alfred Chandler: Essays toward a historical theory of big business*, Harvard Business School Press, Boston Mass.

March JG and HA Simon (1958) *Organisations*, Wiley, New York.

March JG and HA Simon (1993) "Organizations Revisited", *Industrial and Corporate Change*, Vol 2, No 3, pp. 299-316.

Markus ML (1983) "Power, Politics and MIS Implementation", *Communications of the ACM*, Vol 26, No 6, pp 430-444

Matthews RCO (1984) "Darwinism and Economic Change" in DA Collard et al (eds) *Economic Theory and Hicksian Themes*, Clarendon Press, Oxford, reprinted in Witt U (1993) *Evolutionary Economics*, The International Library of Critical Writings In Economics 25, Edward Elgar, Aldershot.

Miller D (1982) "Evolution and Revolution: A Quantum View of Structural Change in Organizations", *Journal of Management Studies*, Vol 19, No 2, pp 131-151

Miller D and PH Friesen (1980) "Momentum and Revolution in Organizational Adaptation", *Academy of Management Journal*, Vol 23, NO 4, pp 591-614

Mintzberg H (1978) "Patterns in Strategy Formation", *Management Science*, Vol 24, No 9, pp 934-48.

Mintzberg H (1990) "The Design School: Reconsidering the basic premises of strategic management", *Strategic Management Journal*, vol 11, pp 171-195

Mintzberg H and JB Quinn (1991) *The Strategy Process: concepts, contexts, cases*, 2nd edition, Prentice-Hall International, Englewood Cliffs.

Mintzberg H and JA Waters (1982) "Tracking Strategy in an Entrepreneurial Firm" *Academy of Management Journal*, Vol 25, No 3, pp 465-499

Mirowski P (1987) "The Philosophical Bases of Institutional Economics", *Journal of Economic Issues*, Vol 21, No 3, September, pp 1001-1038

Morgan G (1986) *Images of Organization*, Sage Publications, Beverley Hills.

Morgan G (1989) "Do Organizations Enact their Environments?" Chapter 37 in G Morgan, *Creative Organization Theory*, Sage Publications, Beverley Hills

Nadler DA and ML Tushman (1990) "Beyond the charismatic leader: leadership and organizational change", *California Management Review*, Winter, pp 77-97

National Extension College (1990) *The National Extension College: A Catalyst for Educational Change*, National Extension College, Cambridge

National Extension College (1996) Reports of internal reviews: Webb R "Organisational Review Project"; Bell J and S Nicholls "Quality Framework"; Belfiore G "Changing Environments for Learning"; Internal unpublished papers, National Extension College, Cambridge

Nelson RR (1995) "Recent Evolutionary Theorising About Economic Change", *Journal of Economic Literature*, Vol XXXIII (March), pp 48-90

Nelson RR and SG Winter (1982) *An Evolutionary Theory of Economic Change*, The Belknap Press of Harvard University Press, Cambridge Mass..

Ngwenyama OK (1998) "Groupware, Social Action and Organizational Emergence: on the Process Dynamics of Computer Mediated Distributed Work" Virginia Commonwealth University, USA and Aalborg University, Denmark, unpublished paper.

North DC (1990) *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge.

Open University (1997) *Council Minutes*, 15th July 1997, Open University, Milton Keynes

Orlikowski WJ (1992) "The Duality of Technology: Rethinking the concept of technology in organizations", *Organization Science*, Vol 3 No 3, pp 398-427.

Orlikowski WJ (1995) "Action and Artifact: The Structuring of Technologies-in-Use", Unpublished paper, Sloan School of Management, Massachusetts Institute of Technology, Cambridge MA..

Pedler M, Burgoyne J and Boydell T (1991) *The learning company: a strategy for sustainable development*, McGraw Hill, London.

Penrose ET (1952) "Biological Analogies in the Theory of the Firm" *American Economic Review*, Vol XLII No 5, pp 804-819.

Penrose ET (1959) *The Theory of the Growth of the Firm*, Basil Blackwell, Oxford.

Pentland BT and HH Rueter (1994) "Organizational Routines as Grammars of Action", *Administrative Science Quarterly*, Vol 39, pp 484-510.

Pettigrew A (1985) *The Awakening Giant*, Blackwell, Oxford

Pfeffer J (1981) "Management as symbolic action" *Research in Organizational Behaviour*, vol 3, pp 1-52

Pickering A (1995) *The Mangle of Practice: Time, Agency and Science*, University of Chicago Press, Chicago

Quinn JB (1980) *Strategies for Change: logical incrementalism*, Irwin, Holmwood Illinois.

Reid S and E Garnsey (1998) "How do small companies learn? Organizational learning and knowledge management in the high-tech small firm", *Proceedings of the 6th Annual High-Technology Small Firms Conference*, University of Twente, Netherlands

Samuels WJ (1995) "The present state of institutional economics", *Cambridge Journal of Economics*, Vol 19, pp 569-590

Schofield J (1996) "Survival of the fittest", *The Guardian*, Thursday November 21 1996.

Schultz RL and DP Slevin (1979) "Introduction: the implementation problem", in R Doktor, RL Schultz and DP Slevin (eds), *TIMS Studies in the Management Sciences*, Vol 13, North Holland, Amsterdam.

Senge PM (1990) *The Fifth Discipline: the art and practice of the learning organization*, Doubleday, New York

Spender J-C (1989) *Industry Recipes*, Blackwell, Oxford

Srinivasan A and JG Davis (1987) "A re-assessment of implementation process models", *Interfaces*, 17, 3, pp 64-71

Stinchcombe A (1990) "Milieu and Structure Updated: A Critique of the Theory of Structuration" in Clark J et al (eds) *Anthony Giddens: consensus and controversy*, Falmer, London

Strassmann D and L Polanyi (1995) "The Economist as Storyteller" in Kuiper E and J Sap (eds) *Out of the Margin: Feminist Perspectives on Economics*, Routledge, London

Strauss AL (1987) *Qualitative Analysis for Social Scientists*, Cambridge University Press, Cambridge

Symons V (1990) "Evaluation of Information Systems: Multiple Perspectives", Cambridge University UK, Unpublished PhD thesis.

Teece DJ, G Pisano and A Shuen (1990) "Firm Capabilities and the Concept of Strategy", CCC Working paper No 90-8, University of California at Berkeley, Consortium on Competitiveness and Co-operation, Center for Research in Management

Tesch R (1990) *Qualitative Research: Analysis Types and Software Tools*, The Falmer Press, Basingstoke

Thomas B (1991) "Alfred Marshall on Economic Biology", *Review of Political Economy*, Vol 3 No 1, pp 1-14.

Tushman ML and E Romanelli (1985) "Organizational Evolution: A Metamorphosis Model of Convergence and Reorientation" in Cummings LL and BM Staw (eds) *Research in Organizational Behavior*, Vol 7, JAI Press Inc., London

Unipalm Group (1995) *Annual report and Accounts*, Unipalm Group PLC, Cambridge.

Van Maanen J (1979a) "Reclaiming Qualitative Methods for Organizational Research: A Preface" *Administrative Science Quarterly*, Vol 24, December, pp 520-526

Van Maanen J (1979b) "The Fact of Fiction in Organizational Ethnography", *Administrative Science Quarterly*, Vol. 24, December, pp. 539-549

Van Maanen J (1988) *Tales of the field: on writing ethnography*, University of Chicago Press, Chicago; London.

Walsham G (1991a) "Organizational metaphors and information systems research" *European Journal of Information Systems*, Vol 1 No 2, pp 83-94.

Walsham G (1991b) "Implementation issues in information systems assessment", published as "Problèmes d'implémentation dans l'évaluation des systèmes d'information", *Technologies de l'Information et Société*, Vol 3, No 2, pp 69-85.

Walsham G (1993) *Interpreting Information Systems in Organizations*, John Wiley & Sons, Chichester.

Walsham G (1997) "Actor-Network Theory and IS Research: Current Status and Future Prospects" in Lee AS, Liebenau J and DeGross JI (eds) (1997) *Information Systems and Qualitative Research*, Chapman and Hall, London, pp 466-480

Walsham G and C-K Han (1993) "Information systems strategy formation and implementation: the case of a central government agency" *Accounting, Management and Information Technology*, Vol 3, No 3, pp 191-209

Weick KE (1979) *The Social Psychology of Organising*, 2nd edition, Addison Wesley, Reading Mass

Weick KE (1991) "The Non-traditional Quality of Organizational Learning", *Organizational Science*, Vol 2, No 1, pp 116-124.

Weick K and Roberts KH (1993), "Collective mind in organizations: heedful interrelating on flight decks," *Administrative Science Quarterly*, 38, 357 - 381.

Woolf V (1926) *Diaries*, Vol III, p 74, April, quoted in Lee H (1996) *Virginia Woolf*, Chatto and Windus, London

Zuboff S (1988) *In the age of the smart machine*, Heinemann, Oxford.